Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone and Sound Waves
PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY, MONADNOCK BLOCK, CHICAGO

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CHICAGO, JUNE 28, 1913

SINGLE COPIES, 10 CENTS
YEARLY, U. S. A., $3; CANADA, $4;
ALL OTHER COUNTRIES, $5

The quality of our telephones and the faith we have in them

enables us to issue a free trouble insurance policy legally binding us to pay for all trouble expense they incur.

Chicago Telephone Supply Company
ELKHART, INDIANA

'INSULATE'

Endorsed by Leading Manufacturers and Engineers as THE BEST for finish—strength—quality.

Switchboard Terminals
Receiver Cases
Handles
Mouthpieces
Insulations for
NUMEROUS ELECTRICAL PURPOSES

Specials of every kind made to order

Facilities Unsurpassed
Deliveries Prompt

GENERAL INSULATE COMPANY
1007-15 Atlantic Ave. BROOKLYN, N. Y.
Agents: R. S. Mueller, 423 High Ave., Cleveland, O.
A. J. Cox Co., 28 S. Jefferson St., Chicago, Ill.

MILLIONS Of Dry Cells Are Handled In This Territory

FRENCH Telephone Cells

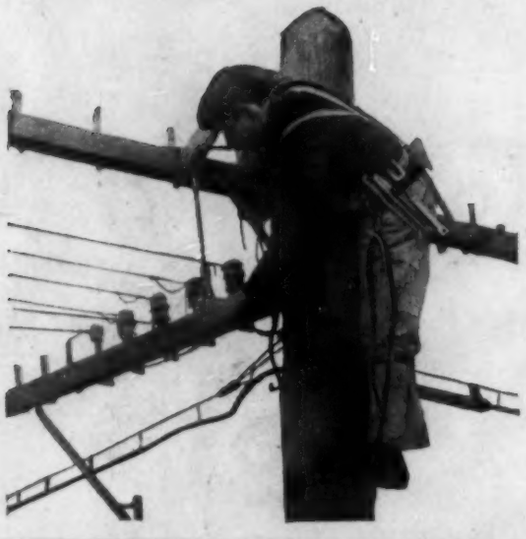
Are Manufactured and Shipped
Direct from Madison, Wis.

There is no reason why the dry cells *you* use should get old in transportation and stock rooms before you install them.

Your orders will be shipped the day received.

Send for new price schedule.

FRENCH BATTERY & CARBON CO.
Madison, Wis.



When he reaches for a tool and grips a

KLEIN

his hand brings more to work than plier, wrench or clamp—*it br.ngs confidence.*

Klein Linemen's Tools have been used by linemen the world over for many years.

Ask for our illustrated catalog

MATHIAS KLEIN & SONS, STATION U34 CHICAGO, ILL.

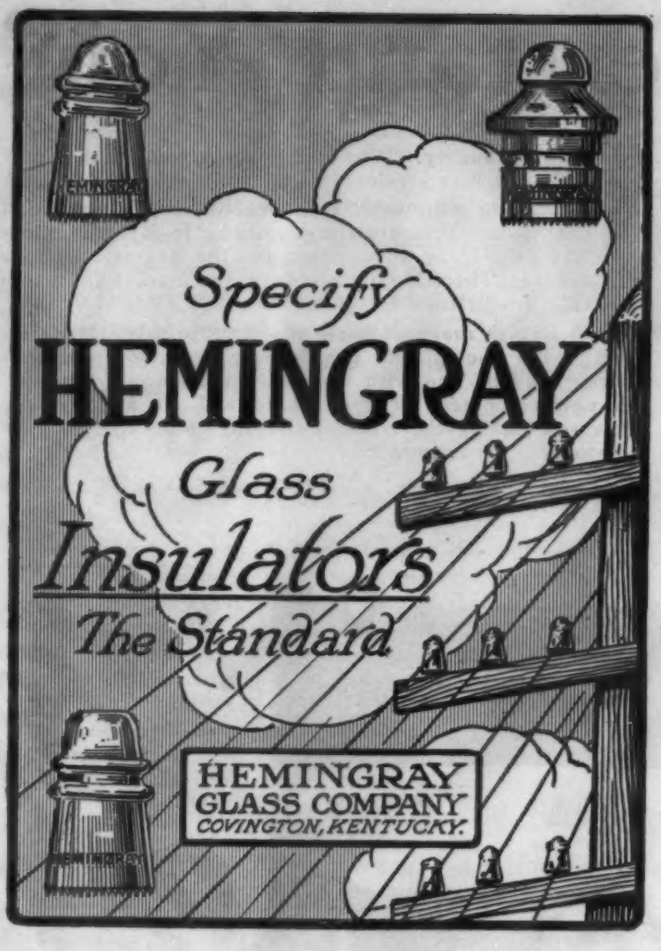
Toll Circuit Minutes

are the most profitable product a telephone company has for sale. Why should they not be as carefully counted as postage stamps? Why let operators guess how long customers talk?

THE CALCULAGRAPH

makes a printed record of the **elapsed time** of circuit use in minutes and fractions of a minute. Impossible for it to make an error. It also saves money.

CALCULAGRAPH COMPANY
1416 Jewelers' Building **NEW YORK CITY**



To meet adequately the most severe operating conditions

Belden Telephone Cords

are specially made. We make a cord or wire for every particular purpose—for each industry requiring individual wire or cords. Our operating facilities enable us to turn out a superior product at a very low price. It will pay you to investigate—***free samples sent on request.***

BELDEN MFG. CO.

2302 South Western Avenue, CHICAGO

The Test Comes in Service

Runzel-Lenz Cords

have given excellent service for years—many companies will use no other cord—for they appreciate the high quality material—and the expert workmanship that is put into Runzel-Lenz Cords—making possible a cord that *wears better—works speedier—lasts longer.*

Our factory and facilities are devoted *exclusively to the manufacture of telephone cordage*—our success demands we turn out good cords.

Some one said of Runzel-Lenz Cords, "They put the *age* in *cordage.*"

Ask for free Samples

Runzel-Lenz Electric Mfg. Co.

1751-1753 North Western Avenue, Chicago, Ill.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

"I Don't Understand You"

How often have you heard this expression, "No matter how good your transmitter and line, just as much depends upon the receiver." The illustration herewith shows our No. 25 "New Bell Receiver," well known in thousands of exchanges as the pioneer of a now generally accepted type, millions in use.

For years this receiver has been made with exacting care to reproduce accurately voice transmission, but not to pick up foreign noises. Every part is properly proportioned—heavy magnet—silk coils—solid brass head—extra heavy shell and cap—a type of terminal that holds the cord right. We sell this receiver at a very low price in view of the quality. Why not re-equip your phones now and give the best service?

Another big seller among our receiver line is this No. 3 aluminum case operator's equipment. It is used extensively by the U. S. Government and the largest telephone exchanges. There is no receiver on the market approaching this in efficiency or lightness.

We furnish many of these receivers to operating companies for re-equipping boards purchased from competitors. May be had with leather or enameled head band. A new equipment of your board will go a long way towards making the hot summer days agreeable to your operators. Order now.

No. 25. American Receiver

Write us or to

Central Electric Co., Chicago, Ill.

Varney Electric Co., Indianapolis, Ind.

Robbins Electric Co., Pittsburg, Pa.

American Electric Co., St. Joe, Mo.

Electric Supply Co., Memphis, Tenn.

Smith-Perry Electric Co., Dallas, Texas.

No. 3. Operator's Receiver.

Write us or to

Robinson Nelson & Co., Richmond, Va.

Herman C. Tafel, Louisville, Ky.

Julius Andrae Sons Co. Milwaukee, Wis.

N. W. Electric Equipment Co., St. Paul, Minn.

Nunn Electric Co., Amarillo, Texas.

Interstate Electric Co., New Orleans, La.

American Electric Company

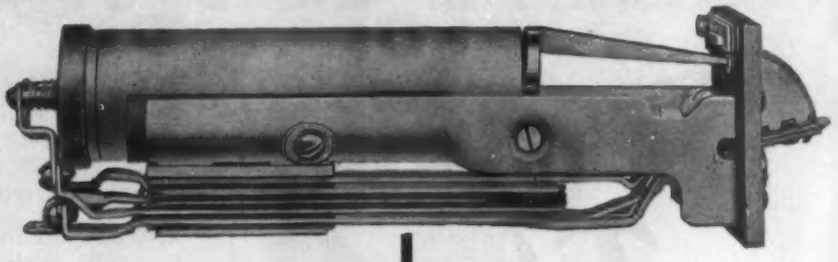
MANUFACTURER

STATE AND 64th STREETS (Englewood Station) CHICAGO, ILL.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

The Only Drop That Meets Every Need

Here is a combined Self-Restoring Gravity Drop and Jack that has proven to be the best for all Local Battery switchboard systems. These are a few of its most important features that make it excel all others.



The No. 11 Drop Is the Most Sensitive

The construction of the shutter, armature and coil and their mechanical relation to all other associated parts has combined in producing a highly efficient drop signal. The simplicity of the design and the high grade quality of selected iron and copper used make the construction of this drop such as will produce the most sensitive drop on the market. *Illustrating the extreme sensitiveness of the No. 11 drop, our standard shop adjustment for a standard 350 ohm drop will be through 10,000 ohms. And, furthermore, this drop will operate every time and successfully through from 15,000 to 25,000 ohms.*

The No. 11 Drop Is the Most Lasting

The improved construction of this drop is as near perfection as can be obtained. Usage has tested and proven every feature to be the best for the purpose and absolutely dependable under all conditions. No parts are weak or inaccessible. It's a simple drop, easily operated and being made of the best materials is therefore the most lasting.

The No. 11 Drop Is the Most Easily Operated

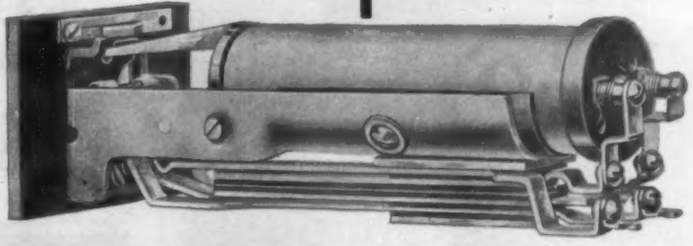
Owing to the long sweep of segmental shutter it may be seen at a great distance from the board and the signal is immediately apparent to the operator regardless of her position. Individually removable from face of board. Drop coil instantly removable from rear of board with disconnecting cable wires. No adjustments necessary and a positive self-restoring combination drop signal and jack.

It's the Best One to Buy

Because it has twice as many practical features as many others. The most modern and efficient. Anything we have claimed for the No. 11 Drop has been proven conclusively daily. Let us show you the No. 11 Drop in use. Be sure your next board is equipped with them — it will save you maintenance money and improve your service.

Write "Send Pamphlet No. 34 and Prices for Magneto Switchboard — lines"

No. 11 Type Self-Restoring Gravity Drop



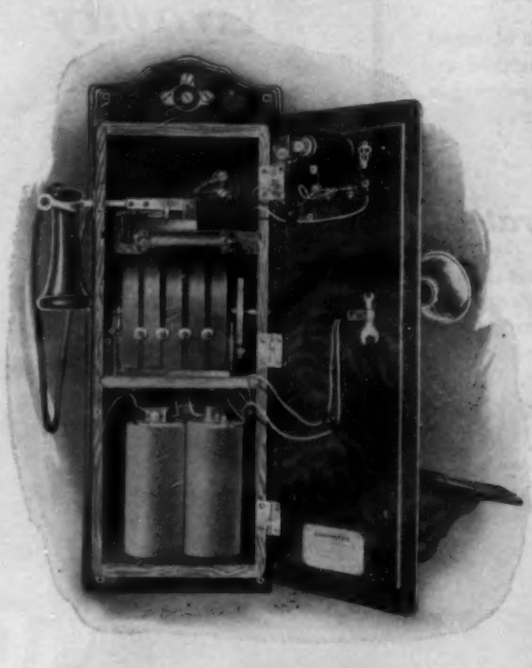
Stromberg-Carlson Telephone Mfg. Co.

Rochester, New York, U. S. A.

Chicago, Illinois — **Toronto, Canada**

Los Angeles, Cal. — **San Francisco, Cal.** — **Seattle, Wash.**

Save That Drive



¶ The cost of one drive into the country frequently equals three months' rental charge on the instrument repaired. Save such a drive once a week, or even once a month, and your profits are increased.

¶ In building Monarch telephones we endeavor to provide against the troubles which make these country drives necessary. Line trouble we cannot obviate or correct, but instrument trouble we can and do reduce to a minimum.

¶ Undoubtedly a study of trouble reports in magneto systems will show that little defects cause the biggest expense. Such things as poorly soldered joints, broken connections at the hinges, broken receiver cords, worn out batteries, defects in generators, etc., are the common troubles which cause the drives into the country.

¶ There are few soldered connections in Monarch telephones because the wiring between the different parts is carried just as far as possible without any breaks. The transmitter cords extend directly from the terminals inside the transmitter to the battery and to the induction coil. These cords are rubber insulated lamp cords, flexible and durable. The connections at the ringer mounted on the door are carried into the cabinet in flexible cords of the same construction. The wiring on the back of the cabinet is plainly visible and set back in a recess so as not to be damaged by contact with a wall or other surface.

¶ The receiver cord used in Monarch telephones is the best that can be produced. It has a strain cord at each end, thus saving the conductors from breaking. The cord is attached to binding posts inside the receiver shell and to binding posts inside the telephone cabinet, so there is less chance of breakage than in other types.

¶ The Monarch transmitter saves money and drives into the country owing to the fact that it consumes less battery than any other transmitter on the market. The batteries last longer and consequently fewer country drives are made necessary.

¶ Monarch generators and ringers have had the reputation for the past ten years of being free from the troubles so frequently found in many makes. The little details of construction have been worked out to provide efficient service and long life.

¶ Bulletin No. 24 fully illustrates and describes Monarch telephones which save the drives into the country and consequently increase the net profits. Write for a copy today.

Monarch Telephone Mfg. Co.
FORT DODGE, IOWA
U.S.A.

Please tell the Advertiser you saw his Announcement in TELEPHONY

Every Fourth Telephone in America is a Stromberg-Carlson

Code No. 988 Type
Induction Coil Mounted in Base

"Central Energy"

Registered Trade Mark

The Standard Desk Telephone with an unequaled service record for durability and efficiency. Quality that makes it distinctive and workmanship which we stand back of at all times. You should use them. Ask for Pamphlet No. 41 today.

Stromberg-Carlson Telephone Mfg. Co.

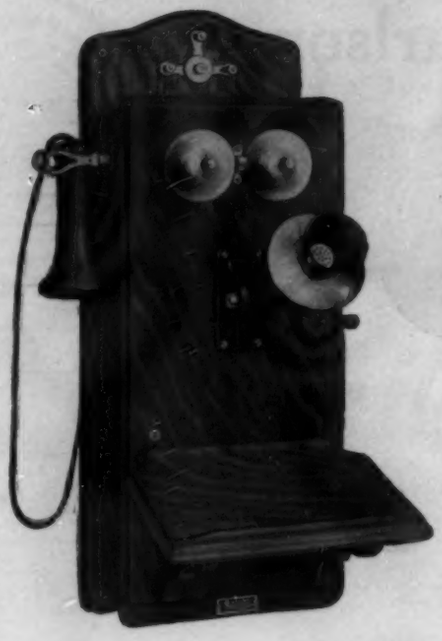
Rochester, New York, U. S. A.

Chicago, Illinois **San Francisco, Cal.** **Toronto, Canada**

Los Angeles, Cal. **Portland, Ore.** **Seattle, Wash.**

Please tell the Advertiser you saw his Announcement in TELEPHONY.

Century 1913 Models



¶ The Century 1913 Model No. 65 Compact Telephone contains all the refinements and useful improvements in Local Battery Telephones.

¶ It is recommended and guaranteed for dependable service, under your operating conditions.

¶ Insure your patrons superior service and your company low maintenance cost by equipping your lines with Century 1913 Model No. 65 Telephone.

Always Order by Code Number

No.	6501	Series	3	Bar	Generator	80	ohm	Ringer,	$ 8.00 each
"	6502	"	4	"	"	80	"	"	8.35 "
"	6548	Bridging	3	"	"	500	"	"	9.30 "
"	6549	"	3	"	"	1000	"	"	9.45 "
"	6503	"	4	"	"	1000	"	"	9.70 "
"	6504	"	4	"	"	1600	"	"	9.90 "
"	6533	"	4	"	"	2000	"	"	10.10 "
"	6550	"	4	"	"	2500	"	"	10.25 "
"	6515	"	5	"	"	1000	"	"	10.05 "
* "	**6505**	"	**5**	"	"	**1600**	"	"	**10.00** "
"	6534	"	5	"	"	2000	"	"	10.45 "
"	6518	"	5	"	"	2500	"	"	10.60 "

Prices are F. O. B. Buffalo, N. Y., and include Batteries. Special quotations made on lots of 10 or more.

Additional Equipment

For "Sure Ring Through" Condenser	25c. additional
For Push Button secret ring to central	25c. "

When ordering push button for grounded system, please so state in order.

***Century Leader for June and July**

All Century Telephones are packed in reinforced paper cartons, making a saving of 30 to 40% in freight charges.

Century Telephone Construction Co.

Buffalo, N. Y. **Bridgeburg, Ont.**

DIAMOND SPECIALTIES

Diamond Reversible Toggle

Used in attaching Telephone Instruments, Back Boards, Insulators, etc., to hollow walls.
The bolt can be reversed and used with either the head or nut for tightening up.

DIAMOND EXPANSION BOLTS

DIAMOND

SCREW ANCHORS

For Securely Fastening Telephone Equipment to Brick Stone and Concrete Walls

"DIAMOND N" 4 POINT DRILL

"DIAMOND N" DRILL HOLDER AND POINTS

Diamond Expansion Bolt Co.

Manufacturers of DIAMOND SPECIALTIES
90 West Street, Corner Cedar NEW YORK

"SAVE TIME AND FREIGHT"

Western Electric Company

"SAVE TIME AND FREIGHT"

New York, Buffalo, Philadelphia, Boston, Richmond, Atlanta, Savannah, Pittsburgh, Cincinnati, Indianapolis, Detroit, Chicago, Milwaukee, Minneapolis, St. Paul, St. Louis, Omaha, Kansas City, Oklahoma City, Salt Lake City, Denver, Dallas, Los Angeles, San Francisco, Oakland, Seattle, Portland.

Also Houses in All Principal Foreign Cities

Address the house nearest you.

"TELEPHONE OUR NEAREST HOUSE" EQUIPMENT FOR EVERY ELECTRICAL NEED "TELEPHONE OUR NEAREST HOUSE"

A Central Exchange

CONSISTING OF

A Cracraft, Leich Magneto Switchboard

AND

Our Pulsating Current Harmonic Converter

OPERATED IN CONNECTION WITH

The Automaphone for City and Village Subscribers

AND

The Cracraft, Leich Compact Type Magneto Telephone for the Rural Subscribers

Provides the most flexible system, giving the best up-to-date service on the most economical basis.

The greatest development along the lines of good, sane and sound practice containing features of unquestionable character is found in Cracraft, Leich apparatus.

The points of precedence embodied in our switchboards are too numerous to mention here. Write us for full information.

Sole Manufacturers of North Manual Apparatus
Common Battery and Magneto

Cracraft, Leich Electric Co.

Genoa, Ill., U. S. A.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

AUTOMANUAL SATISFACTION

POSTAL TELEGRAPH – COMMERCIAL CABLES

CLARENCE H. MACKAY, PRESIDENT

COUNTER No. | TIME FILED | M. | TELEGRAM | CHECK

The Postal Telegraph Cable Company (Incorporated) transmits and delivers this message subject to the terms and conditions printed on the back of this blank

DESIGN PATENT No. 40628

Send the following message, without repeating, subject to the terms and conditions printed on the back hereof, which are hereby agreed to.

Ashtabula, Ohio, May 1st 1913.

[redacted] Company,

[redacted]

Regarding economy, Automanual compared with Manual, we are serving more subscribers by thirty-one (31) per cent handling more traffic by eighty-seven (87) percent, decreased operators pay roll, thirty-nine (39) per cent, and reduced cost per thousand calls sixty-eight (68) per cent. While foregoing is based upon actual figures from our books, it is unfair to Automanual, as no credit is given account raising efficiency from sixty (60) percent to one hundred (100) percent. Are highly pleased with Automanual. Under no conditions would go back to Manual.

THE ASHTABULA TELEPHONE CO
"S.R. NEWBERRY. MANAGER.

We offer similar results to you by the adoption of

"The Automanual"

Send us a description of your plant—we will return an interesting estimate.

THE TELEPHONE IMPROVEMENT CO

MONADNOCK BLOCK CHICAGO — *AMERICAN TRUST BLDG. CLEVELAND, OHIO*

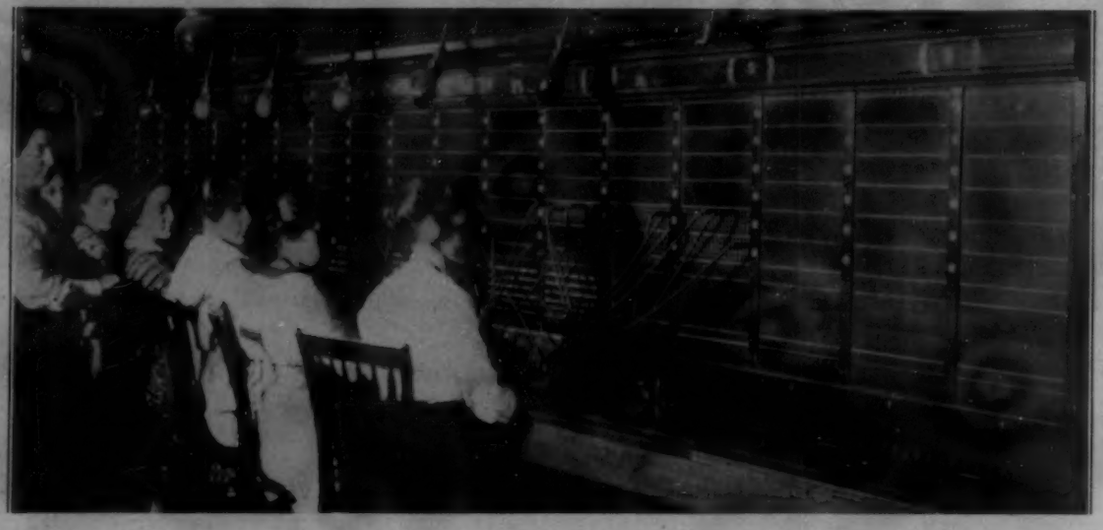
Please tell the Advertiser you saw his Announcement in TELEPHONY.

Your Success Assured by the Adoption of the

Automanual System

It guarantees satisfaction to subscribers, the public service commission and earns dividends.

BEFORE COMPLAINTS



This picture shows the former Manual switchboard at Conneaut, Ohio, where six operators handled 9,000 calls per day at an operating cost of $1.03 per 1,000 calls.

AFTER PROFITS

This picture shows the present Conneaut system after the AUTOMANUAL SYSTEM was installed. Two operators handle an average of 23,000 calls per day at a total operating expense of 33 1/3 cents per 1,000 calls. An increase of business and a decrease in cost.

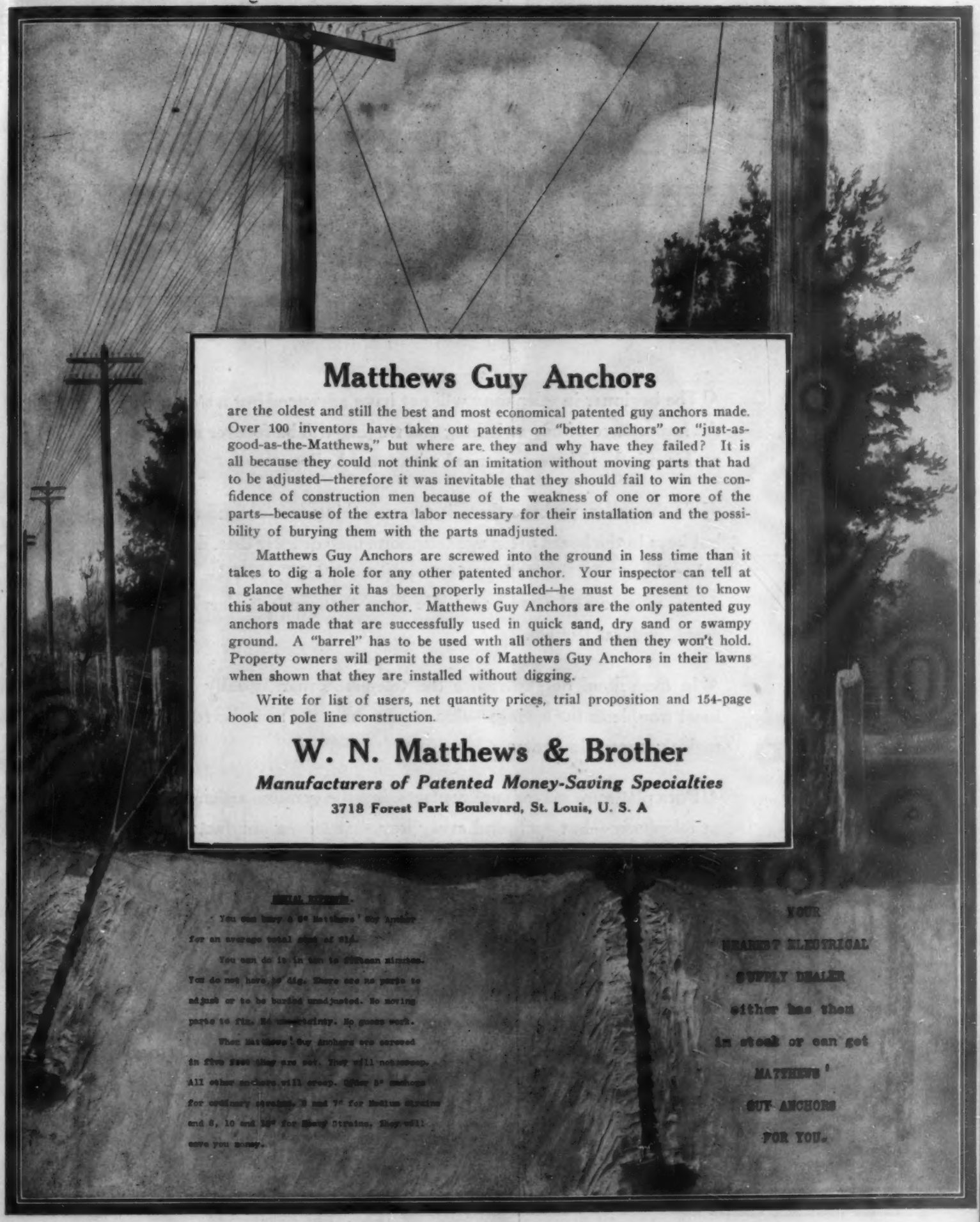
The Public Service Commission of Ohio approved of this re-equipment and the results justify their judgment. Write for estimate.

Distributed and Engineered by

The Telephone Improvement Co.

Monadnock Block, Chicago
American Trust Bldg., Cleveland, Ohio

Please tell the Advertiser you saw his Announcement in TELEPHONY.



Matthews Guy Anchors

are the oldest and still the best and most economical patented guy anchors made. Over 100 inventors have taken out patents on "better anchors" or "just-as-good-as-the-Matthews," but where are they and why have they failed? It is all because they could not think of an imitation without moving parts that had to be adjusted—therefore it was inevitable that they should fail to win the confidence of construction men because of the weakness of one or more of the parts—because of the extra labor necessary for their installation and the possibility of burying them with the parts unadjusted.

Matthews Guy Anchors are screwed into the ground in less time than it takes to dig a hole for any other patented anchor. Your inspector can tell at a glance whether it has been properly installed—he must be present to know this about any other anchor. Matthews Guy Anchors are the only patented guy anchors made that are successfully used in quick sand, dry sand or swampy ground. A "barrel" has to be used with all others and then they won't hold. Property owners will permit the use of Matthews Guy Anchors in their lawns when shown that they are installed without digging.

Write for list of users, net quantity prices, trial proposition and 154-page book on pole line construction.

W. N. Matthews & Brother

Manufacturers of Patented Money-Saving Specialties

3718 Forest Park Boulevard, St. Louis, U. S. A

Please tell the Advertiser you saw his Announcement in TELEPHONY.

Pure Platinum Contact Points in Kellogg Keys

Three Kellogg Key Springs Actual Size

¶ The beginner in telephony will not have advanced but a step before the importance of key switching and ringing will be forever impressed on his mind. The experienced man buys Kellogg keys.

¶ To the seller, perhaps there is no such thing as a second class key, but keys in the board often age telephone men quicker than delinquent subscribers. In the Kellogg factory, there MUST NOT be any such thing, as a second class key. We have thousands in service many years, without trouble.

¶ In the school of experience the telephone man usually finds the most trouble in the springs—due to poor material soon corroding and making uncertain contacts.

¶ Pure platinum makes sure contacts, but the genuine article is scarce in telephony—but each and every key that leaves our factory HAS pure platinum contacts in German silver springs.

¶ Kellogg key springs retain their resilience indefinitely and the pure platinum contacts do not become tarnished or corroded.

¶ Kellogg keys have heavy nickeled brass frames. The accurately drilled cam lever rolls on a carbon steel pin in a hard steel bushing. Friction is further reduced by using hard rubber rollers on brass bearings.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

¶ Note the three pure platinum contact points on the three separated springs of German silver. Mica and fibre insulation are not used because they are not the best for this purpose.

¶ Kellogg keys: Work dry, without sticking.
Do away with generator noise.
Have perfect alignment—less wear.
Have compact design—easy operation.
Allow ample shelf room—convenience.
Never—"ring back" in changing contacts.
Have PURE PLATINUM spring contacts.
Have pure hard rubber insulation, better than fibre.

¶ "Although Kellogg keys have been universally imitated, they have never been successfully duplicated."

KELLOGG SWITCHBOARD & SUPPLY CO.

CHICAGO, ILLINOIS

KANSAS CITY, MO. SAN FRANCISCO, CAL.

CANADIAN SALES OFFICES:

REGINA, Deering Electric, Ltd. WINNIPEG, Houston & Co., Ltd. VANCOUVER, B. C. Hoist & Co.

THE DEAN ELECTRIC CO.

LOOK FOR "DEAN" WHERE "QUALITYS" SEEN

Lineman's Testing Set

The Dean Lineman's testing set is the most compact portable test set on the market, containing a complete, full size magneto telephone apparatus. The cabinet is of oak, substantially put together. The carrying strap is of heavy leather made in two parts with snap catch, which enables the lineman to hang the set over a cross-arm in a convenient position. The talking equipment, the vital part of a telephone or test set, is composed of standard Dean transmitter, Dean watch case receiver and induction coil. Dean generators (4-bar) are used—while the regular Dean ringers are supplied. This set is 8-7/8 inches high, 5-5/8 inches wide and 4-11/16 inches deep—the weight is aproximately 12 pounds.

The **compactness** and **light weight** of the Dean Test Set is not obtained at the expense of an unhandy shape and poorly balanced design. The **shape** of the Dean Test Set is such that it is easily carried up a pole and through the wires.

MAIN OFFICE AND FACTORY
ELYRIA OHIO.
BRANCHES
KANSAS CITY MO. SAN. FRANCISCO CAL.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

COOK

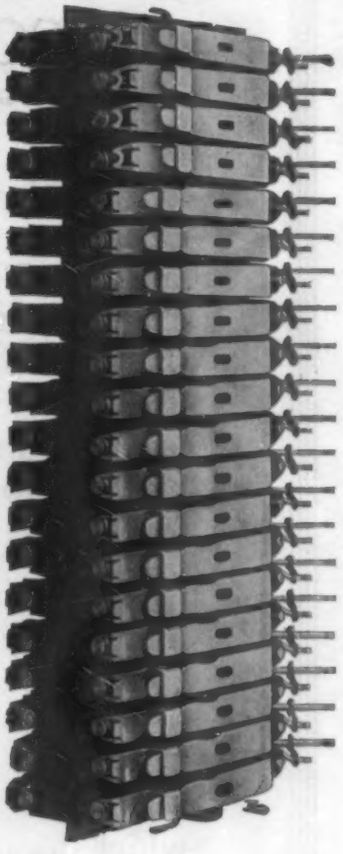
TERMINALS PROTECTORS

"—We have not lost a single pair in our cable and not a drop in our switchboard where we use your

No. 10 Protector

—This stuff has been in use for 5 years in the vicinity of power and high tension lines and we have been in actual contact several times.

What more can we say?"



The above is an extract of a letter received from the Akron Tel. Co., Akron, Indiana.

Write for Our Catalog

Frank B. Cook.

326 West Madison Street
Chicago

Western Representative:
Manny-Meyers Co.,
Seattle, Wash.

Southwestern Representative:
Tel-Electric Co.,
Houston, Tex.

CHICAGO

THE TWENTIETH CENTURY TELEPHONE

ECONOMY,

With Efficiency,

tells half the story of the Superiority of AUTOMATIC telephony over manual.

The largest single item of operating and maintenance expense which a company using the manual system has to meet is switchboard operators' salaries. The larger the system the greater in proportion becomes this charge. But even when there is no growth in the number of subscribers, there is a constant increase in this expense, for operators' wages are going up. Every year switchboard girls demand and obtain more pay for fewer hours of labor, and each year it becomes harder to obtain competent employees for this work at any price.

How to keep this expense down is the biggest problem now confronting manual exchange managers, and its only logical and permanent solution is

The Automatic

which does not compromise with the switchboard operators; it eliminates them and all the expenses they necessitate—salaries, training and "wellfare work." And this is only one of the many economies of the **Automatic.**

Justice to your stockholders demands that you investigate this system.

AUTOMATIC ELECTRIC COMPANY,
CHICAGO.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

THE TWENTIETH CENTURY TELEPHONE

EFFICIENCY,

With Economy,

sums up the rest of the superiority of AUTOMATIC telephony over manual.

Operators' mistakes cause fully three-fourths of the complaints subscribers lodge against manual telephone service. Misunderstood numbers, wrong connections, interrupted conversations, premature cut-offs, impertinence, inattention, delay, all these are due to the switchboard operators and annoy subscribers more than all other "troubles" combined. Elaborate systems of selecting competent girls, rigid training to make them efficient and constant supervision to keep them so, are the methods used by the manual exchange manager to increase the efficiency of his service. And when he has finally found a competent girl, and trained her until she is fairly efficient, he is seldom able to keep her more than a year, or at most two. She either marries or finds a better position. But

The Automatic

does mechanically, perfectly, that which the human hand does imperfectly. There are no delays, no wrong numbers, no interrupted conversations; and these are but a few of the efficiencies of the **Automatic.**

Justice to your subscribers demands
that you investigate this system.

AUTOMATIC ELECTRIC COMPANY,
CHICAGO.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

PARANITE

The Standard for Telephone use

Rubber Covered Wires and Cables

Braided, leaded and armored cables; plain and braided copper and iron wires of any number of conductors *Manufactured by*

Indiana Rubber and Insulated Wire Company
JONESBORO, INDIANA

AMERICAN CROSS-ARM CO.

CHICAGO

Send for Samples and Prices!

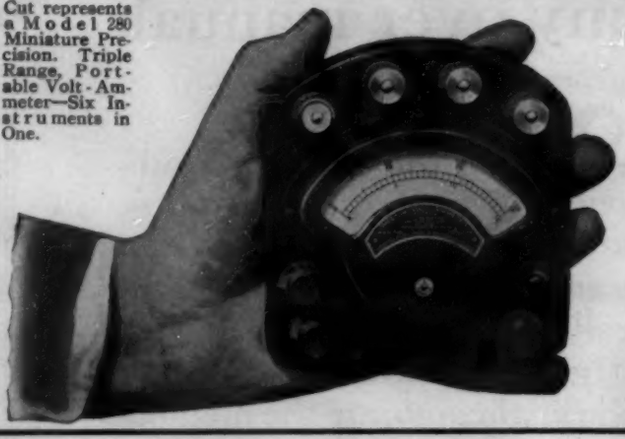
BURNLEY SOLDERING PASTE

"The Old Reliable" for telephone work. Free from acids or injurious elements. Safe—easy to use. If you buy it of your dealer, look for trade mark.

Put up in paper and tin boxes.

Burnley Battery & Mfg. Co.
Dept. T. North East, Pa

BURNLEY



Cut represents a Model 280 Miniature Precision. Triple Range, Portable Volt-Ammeter—Six Instruments in One.

New Weston Miniature Precision Portable Instruments

Model 280

Are especially adaptable for use in telephone inspection service. Instruments are provided with a neat leather carrying case and shoulder strap, or they may be slipped in the coat pocket.

These are strictly high grade instruments, possessing the excellent characteristics which have made Weston Standards famous throughout the world.

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The Days of Reconstruction.

"The present period in the telephone business reminds me of the reconstruction days after the Civil War," said a well known telephone man who visited TELEPHONY's office the other day. The remark aroused some curiosity, and the visitor explained that, in his opinion, as politics and selfishness took the place of actual fighting in the South in the '60's, so they have followed the cut-throat battle in the telephone world.

The public became interested in the telephone on the expiration of the Bell patent and demanded good service at a reasonable rate. The interests that had been in control so long, did not greet this request very kindly, but manifested a disposition to sell the kind of service they cared to render at the price they cared to charge. The result of this policy and the public resentment caused thereby, was the installation of 4,000,000 Independent telephones within the next 15 years.

Finding themselves hopelessly outclassed in local enterprises, the Bell interests for some years left no stone unturned to seize home enterprises so they could be listed as "affiliated," or sub-licensee companies. This is said to be the situation in the Central Union territory, where, so far as the Bell is concerned, there is little real construction work now going on. The law suit started by the minority stockholders has given the interests all they care to handle in that region. They are also advising Independents in the same territory to lie dormant and spend no money in view of what may happen in the near future.

This is believed to be a mistaken policy. If your plant is located in Central Union territory, it would be a good plan to settle down to building up your service and strengthening your relations with the public. Should the law suit referred to end in the court giving the minority stockholders a voice in the management of the Central Union, it is not likely they would sell their local plants to you at a low figure. More likely, they would insist on the parent Bell company rehabilitating the Central Union with low tolls, lucrative commissions and other "natural advantages" that would enable them to give the Independent competitors a hard fight for the local field.

The safest way to proceed now, it would seem, is to give your patrons the best service possible, and with strong support at home be prepared for whatever comes. At all events, the province of a telephone company is to furnish efficient telephone service, and the company which does that will prosper if it gets anything like a square deal. Put your house in order, keep up your equipment by buying from Independent manufacturers, and bear in mind that when the kinks are finally straightened out of the telephone game, you will be more than ever convinced that you are in the best business on earth.

Increasing The Efficiency of Toll Circuits.

The value of keeping toll circuits in use by revenue paying parties is appreciated by all telephone companies and it is realized that much revenue is lost through circuits being inefficiently operated. It has been stated that the loss on the toll circuits of Independent telephone companies amounts to several million dollars a year and that much of this can be saved through improved methods of operation.

Studies have been made looking to increased efficiency and it has been found that the personal equation of the operators is one of the potent factors making for a low efficiency. Various methods have been used to increase the efficiency due to this course. A paper, presented at the annual convention of the American Institute of Electrical Engineers by H. M. Friendly and A. E. Burns, tells how one company has increased its toll line efficiency by use of automatic equipment at various points.

The paper which appears on other pages of this issue describes equipment for eliminating the through operators at intermediate switching offices, the duties of the operators being performed by apparatus under semi-automatic control of terminal operators. Connections may also be established in local exchanges from distant points. Toll operators can call subscribers directly in a distant manual exchange, via the "B" board without disturbing the toll operator at the called exchange, also the service is under the latter's supervision. The automatic equipment used does not, it is stated, restrict or modify the normal uses and operation of the toll lines.

While Your Grit Lasts, You Will

By HERBERT KAUFMAN

He didn't know that he could do it. He wasn't sure that he'd win. He heard the sneers, and he saw the smiles of incredulity, but they didn't stop him. He believed in himself and he went ahead. Occasionally he fell down, but every bruise was an investment. It was a record of one of the wrong ways—an asset which showed him that he could survive, event if he was knocked over occasionally.

He's the man who wasn't content with candle light and went snooping around until he managed to perfect a lamp. After he had the lamp, he yearned for more light. He kept yearning for it until he discovered gas. But even gas wasn't pervasive enough, and so he harnessed up electricity.

He wasn't praised at the start—the man who tries never is. One of the penalties of being greater is to run up against the grating envy and lashing skepticism of the "little folk." But it takes a lot more than an insult or a cold shoulder to chill the real winning impulse.

If you expect to be coddled and cheered, if you're looking for approbation and encouragement, if you haven't stamina enough to stand alone with your ambition and to fight for them 'til you attain them, you're wasting dreams. It's one thing to believe in a theory and another to believe in yourself. Being brilliant is only half of the game—being brave is the other half. The road to the laurel grove runs up the side of a cliff. There are spots where you'll have to hold by your finger tips, but if you're not willing to take the risk, you don't deserve what's up top.

There was a time when strength decided greatness—when the strongest arm and the longest wind made chieftains. But the tourney is no longer the tilt year. For untold centuries, the greatest brutes were the greatest men. The same instinct that then sent their clubs swinging at the physically weak, still survives. They don't understand. They never did understand, you can't expect them to share in your visions. They must touch things, feel them, see them, measure them—all their senses are physical. And so until they see you higher than themselves, they won't place you where you belong.

You'll have to pay for wanting more, or being more, or having more. They'll tear at you. They'll wear on you. They'll block your way and hold you down, until you gather force enough to squirm away from under the crowd.

You'll never suffer so much as when you're getting the least. You'll never need your confidence half so badly as when you doubt yourself most.

You'll have to be brave in the dark—dogged and purposeful. You don't need wealth or position. The want of things creates the impulse to attain them. Farm houses have bred more giants than middle class competency. The man who comes up from bedrock has a heritage that is priceless. He knows that going back to bedrock will still give him a chance to start anew—that poverty cannot ruin, but merely check. And so he risks more and has less fear than those who have been set upon the middle rungs of the ladder at the outset, whose imagination pictures the loss of money as the loss of everything.

Come on and keep on. Take your time and take your lickings. Take everything that belongs to you. Don't sell out to cowardice! When your grit has gone, you're done with. While it lasts, so will You.

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Automatic Methods in Long Distance Telephone Operation

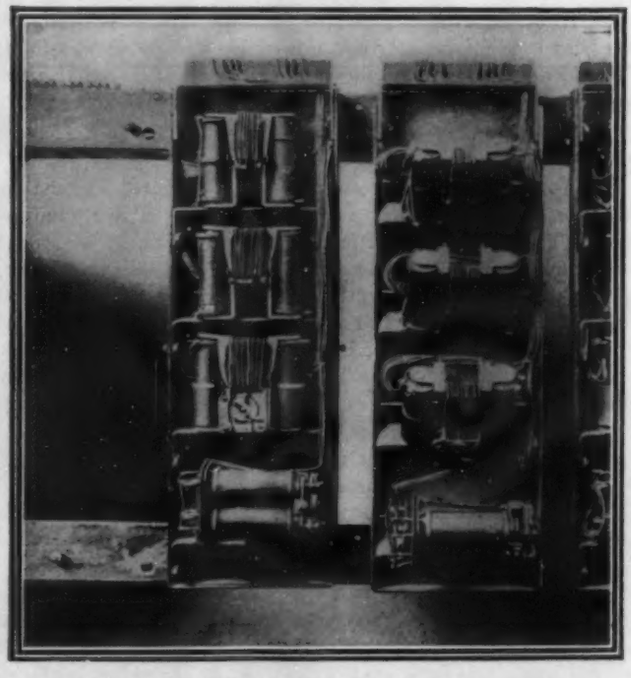
Description of Equipment Used by Northwestern Long Distance Telephone Co. for Increasing the Operating Efficiency of Its Toll System in Washington and Oregon—Paper Presented at Annual Convention of the American Institute of Electrical Engineers

By H. M. Friendly and A. E. Burns

In designing the equipment used by the Northwestern Long Distance Telephone Co., operating a toll system connecting Independent local telephone exchanges in Western Oregon and Western Washington, the first consideration was to improve the traffic capacity of operators, lines and equipment. Incidental to this was the desire to render the work of the operator more mechanical, so that the personal equation would be eliminated as far as possible in the handling of switching equipment. To this end, somewhat radical and seemingly complicated electrical circuits were resorted to in accomplishing complete, positive lamp supervision, and in meeting various traffic requirements and expedients, but as long as such departures from common practice meant simpler operating, more rapid switching, or increased transmission efficiency, all consistent with reliability and normal maintenance, the means were considered as fully justified.

The fact that the Northwestern Long Distance Telephone Co. had no direct authority over its connecting companies, the inability to exercise discipline and strict traffic rules over foreign operators had to be taken into consideration, and every possible step employed to improve and quicken the service in order to counteract this deficiency, competition for business being very keen.

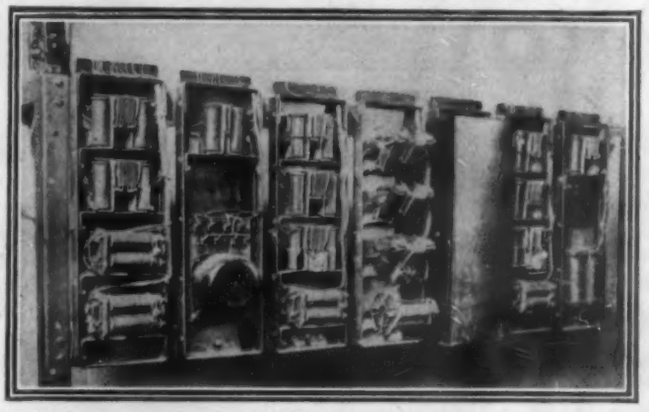
It will be observed, the equipment on the toll switchboards proper, is free from special, irregular or complicated devices that require great care and special instruction for proper operation—that the circuits are uniform at all operators' positions—that the minimum of apparatus subject to adjustment is employed in the switch board; such apparatus, wired in sets, being placed in the wire chief's room, or in any other place where it may be convenient for inspection and repairs, without in any way interfering with or annoying operators at work.



View of Two Apparatus Sets.

Further, the apparatus sets have been mounted in detachable units, thus allowing a complete change of the character or type of equipment associated with any line without altering or mutilating wiring in the apparatus set.

Each detachable apparatus set consists of a frame ⅛ in. by ¾ in. x ¾ in. (3.1 x 19 x 19 mm.) angle iron, bent to form



Portion of Rack Showing Apparatus Sets with Relays Exposed.

three sides of a rectangle 5 in. x 16 in. (12.7 x 40.5 cm.), the top being left open. A piece of 24 gage sheet iron is riveted to the back to form a dust-proof, induction-proof case, and a close fitting sheet iron detachable cover is provided for the front, it being found that where the apparatus sets are mounted close together (6-in. or 15-cm. centers) without cross talk protection, when relays of one set were being operated, induced clicking noises could be heard on the lines associated with the nearby apparatus sets. The top of each apparatus set frame is closed by a piece of the same angle iron, bent and pivoted to form a sort of rocking switch carrying eleven insulated points used as terminals. These points are designed to engage with insulated companion springs or clips on the stationary rack, the latter being made of 3/16 in. x 2 in. x 2 in. (4.7 x 50.8 x 50.8 mm.) angle iron. All external wires are brought to the rack springs permanently. Thus to remove an apparatus set, and substitute another, it is only necessary to disengage the clips, unhook the set from the rack, place the desired set on the rack and tilt the rocking switch so its points engage their companion rack springs.

All wiring of the sets is brought out to the rocking switch, the wiring having extra heavy braided insulation, and so disposed loosely in the set that it is not injured by the small hinge movement of the rocking switch in cutting the set in or out of service. The detachable feature of the apparatus sets allows such equipment at distant offices to be removed and sent to the shop for repairs or alterations in specially designed shipping boxes, avoiding the necessity of sending out a high-priced man and paying the incidental cost of transportation, etc. The expense of one such trip alone to some of the distant offices would more than pay the cost of a duplicate set to be kept for such emergencies. An operator, or any inexperienced person, can easily effect a change of sets, place the displaced set in the special box and express it to the shop.

The relays used in the apparatus sets are mostly of the auto-

matic vertical type. This type was chosen because of its adaptability, almost any circuit combination desired being possible by merely assembling the proper springs and insulating bushings. The contacts can be given any reasonable degree of tension or pressure, and the slight sliding movement due to construction tends to keep the contact surfaces bright and free from dust.

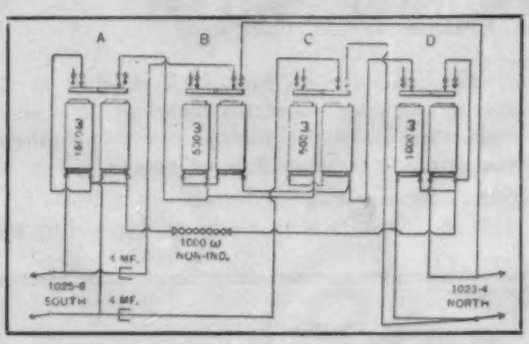


Fig. 1. Through Switching Circuit—Two-Way Ring-Back.

The margin of adjustment in this type of relay is also very wide, and all parts are easy of access for inspection and maintenance. These relays are mounted upon angle iron shelves, pivoted in the apparatus set frame in a manner similar to the switch at the top, allowing all the wiring and relays to be tilted out, inspected and repaired without removing them or mutilating the wiring. A gravity catch locks the relay mount in place when tilted back into normal position. The repeating coils, retardation coils, condensers, etc., associated with the apparatus sets are mounted on the back thereof, since there are no moving parts to inspect or adjust.

Another type of relay that has proved its usefulness and reliability is a polarized relay designed expressly, on the plan of a polarized ringer, and which is compact and extremely sensitive, though capable of withstanding abnormal currents without impairing its adjustment—such as 20-cycle ringing power. This relay is also mounted as a part of the apparatus set, on a pivoted shelf, when the equipment comprises such a relay.

The apparatus sets are secured to the rack by slots which slip over the heads of round head machine screws on the rack angle iron, the slots being enlarged at the bottom to take the heads of the screws.

One of the first conditions to be surmounted was in the territory between Portland and Tacoma, a distance of 145 miles (233 km.). From Portland north to Centralia, a distance of 95 miles (152 km.), is a No. 10 B. & S. copper circuit, used as a way-line on which are ten stations and offices, each with a 1,600-ohm signal (switchboard drops and bells having the same type of movement) having a 2 m. f. condenser in series therewith. This latter provision is carried throughout the entire system to facilitate line testing and fault location. From Chehalis, 4 miles (6.4 km.) south of Centralia to Tacoma, a distance of 50 miles (80 km.), is a similar way-line on which are ten stations. Thus the way-lines lap for a distance of 4 miles (6.4 km.) between Centralia and Chehalis.

This lapping was done since these towns are the largest between Portland and Tacoma and incidentally are about equal in importance from a traffic standpoint from both directions. The lapping of the circuits obviates delays such as would ensue if intermediate switching had to be resorted to. For normal switching between Portland and Tacoma, and Portland and Seattle, the latter 40 miles (64 km.) north of Tacoma, through trunk lines were provided. However, it is often desired to press into requisition the two way-lines above mentioned for Portland-Tacoma traffic. Any intermediate traffic is handled over these way-lines, excepting rush calls when the way-lines are busy. Two No. 10 B. & S. copper way-lines are provided in addition to the above, between Portland and Castlerock, a distance of 62 miles (99 km.) north. These lines are equipped for calling direct into the local automatic exchange at Portland; the methods used will be explained further on.

Delays in the establishing of, and in the taking down of switching connections manually at Centralia or Chehalis for such through traffic led to the equipment of the way-lines for performing this function and interconnection and disconnection remotely, from either Portland or Tacoma under the instant automatic control of the operators—day or night. The electrical circuit accomplishing this is shown in Figs. 1 and 2, and later described. The operating specifications of the through switching circuit are as follows:

The lines are normally used as way-lines without any restrictions whatsoever. Assuming that Portland desires to communicate with Tacoma—bear in mind that the switching and line equipment at both Portland and Tacoma is identical, excepting that battery on relay *D*, Fig. 1, is reversed at Tacoma as indicated in the diagram, and similarly operated and that the equipment at Centralia for effecting the interconnection (obviously this equipment could have been installed at Chehalis, or even on a pole between the towns, with the same effect) is actuated from either Portland or Tacoma. First the Portland operator ascertains if the Portland-Centralia line is busy by listening in on the line. If not busy, the operator withdraws the plug from the regular jack and inserts it into the jack following, which may be called the through switching jack. Over the latter jack is a number designating the remote line. Inserting the plug into the through switching jack causes the equipment at Centralia to be actuated, connecting the lines, so that the Portland operator by listening in can instantly know if the remote line is idle, and that without any disturbance to possible users on the remote line.

If the remote line is found idle, the Portland operator rings Tacoma's signal, or the signal of any office on the remote line in the usual way with her regular cord ringing keys, no special keys or devices being employed. Since no bell on the near line rings from the through switching jack, the same code of signals has been used on the near and remote lines so far as was found convenient. Incidentally, the signal showing at Tacoma in this instance is above the through switching jack, indicating that the signal comes from Portland. The object of this will be shown later.

If an intermediate office on the near line desires Tacoma for instance, such office rings Portland in the usual way and requests Tacoma. The Portland operator, acting as a through operator, removes her plug from the regular jack and inserts it into the adjacent through switching jack, and if the remote line is found idle, signals as above. As no ringing impulses are projected on the near end, from the through switching jack, an operator listening in at the intermediate office hears no disturbance. When Tacoma answers the signal corresponding to her through switching jack, the Portland operator can leave the line at once, as Tacoma's plug being in the through switching jack, maintains the through connection.

If the call cannot be completed at once, Tacoma signals the calling office over her through switching jack when ready. Portland pays no further attention to the call, and makes no note of it, since Tacoma is a checking office. If, however, an intermediate office on the remote line is desired, the Portland operator supervises and checks the call as if it were a through switch made manually at Portland, which from an operating standpoint, it is. Tacoma in the latter instance would ignore all signals for intermediate stations coming in on the signal associated with her through switching jack, knowing that Portland, a checking office, is supervising such switches, although Tacoma checks all signals for intermediate stations coming in on the regular line signal.

The electrical details are as follows:

1. The Portland operator plugs into the through switching

jack, projecting battery out on the line and operating the relay at Centralia, cutting the lines together.

2. The operator rings on the through switching jack which operates a relay in the apparatus set that reverses the battery projected out on the line. This reversed battery operates a polarized relay at Tacoma, and throws 20-cycle ringing power back on the remote line, the relay at Centralia simultaneously breaking the line connection during the time the current is reversed.

3. When the ringing key is released, the current is restored to the original direction, the relay at Centralia operates, and the through talking circuit is re-established.

4. When the call is completed the operator withdraws her plug, and the lines are restored to their normally separate condition as far as speech is concerned.

Referring to Fig. 1 at the top of which are shown the eleven insulated terminal points carried by the rocking switch at the top of the apparatus set, the companion springs at the top of the rack are connected as shown: No. 1 to main ground; No. 2 and No. 3 to the two wires extending to the line to the spring jack and drop associated with the line; No. 4 to a set of batteries, in this case dry cells having the negative or zinc pole grounded; No. 5 and No. 6 to the through switching jack and associated signal; No. 7 with the shell or "relay wire" of the through switching jack; No. 8 and No. 9 to 20-cycle ringing power; No. 10 to the shell of the regular line jack, and No. 11 to the main storage battery having the positive pole grounded.

Tracing a particular call, say from Kelso on the Portland way-line to Yelm on the Tacoma way-line, and knowing the modus operandi of the call from the preceding paragraphs, the action of the relays shown in Figs. 1 and 2 can be followed. When Kelso rings, the Portland signal associated with the regular line jack is actuated, the jack and drop of the through switching line being unconnected. Portland answers by plugging into the regular line jack, ascertains that Yelm is wanted and changes the cord plug to the through switching jack. The third

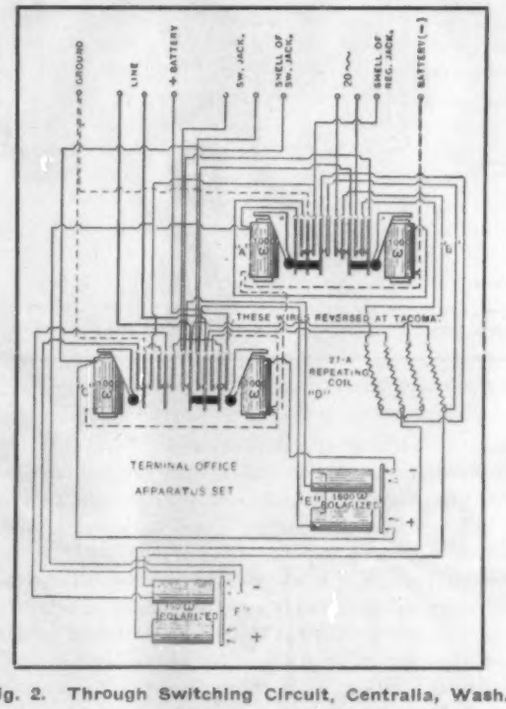


Fig. 2. Through Switching Circuit, Centralia, Wash.

or shell wire of this plug is grounded, and engaging the shell wire of the through switching jack, throws a ground through point No. 7 of the apparatus set and actuates relays *C* and *D*, Fig. 1; also actuating the cut-off relay associated with the through switching jack. Relay *D* connects the switching jack to the line, and in conjunction with relay *C* projects battery current to the center of relay *F*, where it divides and finds its way through the coils of relay *F*, through two windings of the repeating coil to the line.

Following the line to Fig. 2 (Centralia) the battery current flows through the coils of relays *A*, *B*, and *C*, dividing again through the coils of relay *D* to reach the Tacoma way-line. The apparatus set at Tacoma is identical with Fig. 1, except, as may be noted, that two of the wires are reversed on relay *D* so that the batteries at Portland and Tacoma will not be opposed when operators have cord plugs in their respective through switching jacks, and the current for ringing control is necessarily of the opposite polarity. Following the line to Fig. 1 again, this time at Tacoma, the current can be traced through the repeating coils and the coils of relay *F* to ground, whence it returns to the battery at Portland. The current thus established flows on the line from Tacoma to Portland, and relays *B* and *C*, Fig. 2, are wired to operate with this direction of current, connecting the two way-lines together through two 4 m. f. condensers. Relay *F* at Tacoma operates to the minus side and thus produces no effect.

When Portland rings, relay *E*, which is bridged across the line, vibrates and thus keeps the contacts practically wide open, the period of contact being of short duration. This allows relay *D*, which has a strong tension, to fall back. Tracing the circuit as before, with relay *C* actuated and relay *D* normal, plus battery current from point No. 4 of the rocking switch is finding its way to the line and through the sets at Centralia and Tacoma as before, but this time the current flows in the reverse direction, from Portland, to Tacoma, actuating relays *B* and *C* at Centralia in the plus direction and breaking the talking connection. Relay *F* at Tacoma is also actuated in the plus direction and actuates relay *A* which in its turn actuates relay *B*. Relay *B* impresses 20-cycle ringing power on the through switching jack, and actuates the associated line signal, apprising the Tacoma operator that Portland is ringing, and not some intermediate station, the regular line signal not being actuated since relay *A* grounds the shell of the regular line jack, and operates the cut-off relay associated with this jack. Relay *B* also impresses 20-cycle ringing power on the primary winding of the repeating coil, and as relay *A* has short circuited the inner lugs of the secondary winding, 20-cycle ungrounded ringing power is thus projected out on the line.

This is important, as the normal ringing power is grounded on one side, and if thrown directly on the line would shunt out a large portion of the operating current, while the alternating current from the live side of the ringing generator would return to ground through the relays of the set, vibrating them and thus breaking up the ringing impulses projected out on the line. Also, grounded ringing power or ringing power subject to grounds from intermediate stations must be guarded against, otherwise the switching relays at Centralia would operate, cutting the lines together and interferring with service, while the relays at the terminals would operate the switchboard signals and also ring back on the line. This is prevented in two ways.

1. In Fig. 2, the line circuit is carried through the contacts of relays *A* and *B* before reaching the windings of relays *B* and *C*, the switching relays, and any ringing currents on the lines will open these contacts, preventing any ground leakage from operating *B* or *C*.

2. In Fig. 1, relay *A* operates with a ground from relay *F*, and the former in its turn operates relay *B*. The interval of time necessary to accomplish this being comparatively long, ringing impulses of any ordinary frequency will not endure long enough to complete the series of operations. It will be noted, however, that the intermittent ground from the contact of relay *F* is passed on from relay *A* to relay *B*. If the main ground were independently wired to the contacts of each relay, it would have the opposite effect, that of producing a steady action of relay *B* by the intermittent action of relay *F*.

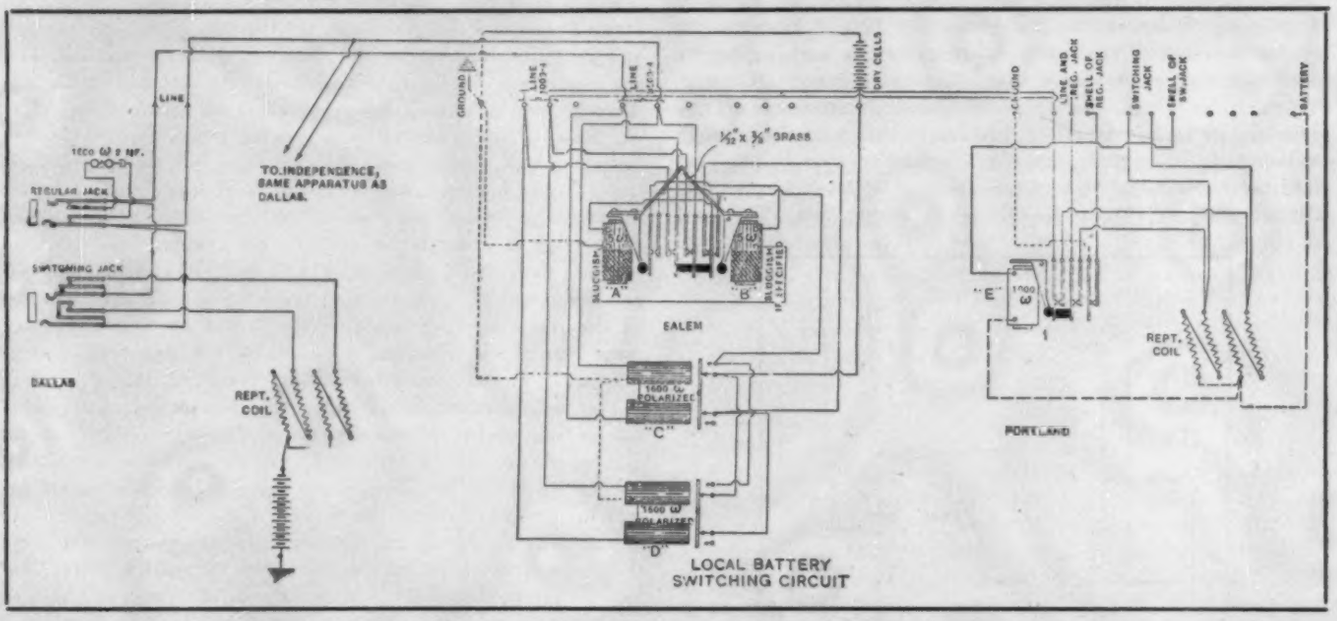
Of course, this could be obviated as in composite telegraphy, by using a howler or high frequency ringer, or by the use of repeating coils at these stations, but this would increase the amount of equipment in the aggregate to more than is required in these sets to prevent the trouble. The endeavor has always been to keep unnecessary or unavoidable equipment off the line at points where there is no competent man to maintain it. As used, the three apparatus sets can be disconnected from the lines if desired by pulling the switches at the top of each set, and not only will the normal operation of the lines be unaffected by the change, but no extra apparatus will be left on the line at any of these offices. Conversely, all of these apparatus sets may be regarded as supplementing the regular line equipment, and any facility they may afford in operating may be regarded as that much clear gain.

In the case of the above through switching circuit, ringing power is projected back from the opposite terminal office, since no ringing power is available at Centralia. If such ringing power were available, it could be used to ring in both directions under the control of the terminal offices in lieu of the method used. The manipulation of the circuit would be the same in either case as far as the operators are concerned.

A condition, in a way similar to the one first described between Portland and Tacoma, existed between Portland, and Dallas and Independence via Salem, the latter being 52 miles (83.6 kg.) (No. 10 B. & S. copper) south from Portland, and 15 miles (24 km.) (No. 10 B.w.g. iron) east from Dallas, Independence being on a leg from the latter line. The circuits, Fig. 3, were somewhat modified by reason of the fact that, due to the small number of stations involved, and the short distance, it is found possible to ring through direct from any office on the line. In this circuit a means is provided at each switching station whereby the operator by plugging into the through switching jack causes battery current to be projected out by the line. This battery current serves to operate the through switching relays at Salem which connect the two lines for talking. Ringing is done directly in the usual manner, and at the termination of the call, the switch is released on the removal of the cord plug from the through switching jack. Two jacks are provided at both Dallas and Independence, Fig. 3, one the regular jack line, used for normal manual switching, and a through switching jack provided with extra contacts for connecting the split retardation coil to the line. The center of this coil is connected to battery, the current following the line to Salem and operating the switching relays.

A similar action takes place at Portland where the retardation coil is connected to the line by means of relay *E*, which is operated from the shell of the through switching jack, projecting current on the line and operating the switching relays at Salem as before. Also, if Dallas, Independence and Portland, should all plug into their respective through switching jacks simultaneously, the same effect would take place, the currents from the different sources merely aiding each other after the connection is established at Salem.

The operation of the apparatus set at Salem is on the plan of mechanically locking relay, which locks the lines together when actuated by relays *C* or *D*, Fig. 3. This relay is operated by six dry cells, and for economy in battery consumption is made to disconnect the local battery after locking mechanically. By this means one set of dry cells can be made to supply the necessary current for a number of months, whereas maintaining the locking action by means of current would shorten the life of cells to a few weeks or possibly days, depending upon the amount of traffic. Either relay *C* or *D* operating to the minus side actuates relay *A*, which when closed actuates relay *B*. Relay *A* is now disconnected from the battery on the back contact of relay *B* and, after a slight pause due to its sluggish properties, falls back. It will be seen from the diagram that this mechanically locks relay *B* in the operated position, disconnecting it electrically and it remains in this position as long as relays *C* and *D* are energized, holding the lines connected for talking and ringing purposes.



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When the plug is removed from the through switching jack at the calling office, the current ceases to energize relays *C* and *D*, and upon one or both of these relays making contact on the plus side, which is in the normal position of the armatures, current again flows through a make contact of relay *B*, actuating relay *A* and unlocking *B*. Upon returning to its normal position, the current in relay *A* is broken, and it, too, returns to its normal position, when the set is ready for another switch.

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Of course, this could be obviated as in composite telegraphy, by using a howler or high frequency ringer, or by the use of repeating coils at these stations, but this would increase the amount of equipment in the aggregate to more than is required in these sets to prevent the trouble. The endeavor has always been to keep unnecessary or unavoidable equipment off the line at points where there is no competent man to maintain it. As used, the three apparatus sets can be disconnected from the lines if desired by pulling the switches at the top of each set, and not only will the normal operation of the lines be unaffected by the change, but no extra apparatus will be left on the line at any of these offices. Conversely, all of these apparatus sets may be regarded as supplementing the regular line equipment, and any facility they may afford in operating may be regarded as that much clear gain.

In the case of the above through switching circuit, ringing power is projected back from the opposite terminal office, since no ringing power is available at Centralia. If such ringing power were available, it could be used to ring in both directions under the control of the terminal offices in lieu of the method used. The manipulation of the circuit would be the same in either case as far as the operators are concerned.

A condition, in a way similar to the one first described between Portland and Tacoma, existed between Portland, and Dallas and Independence via Salem, the latter being 52 miles (83.6 kg.) (No. 10 B. & S. copper) south from Portland, and 15 miles (24 km.) (No. 10 B.w.g. iron) east from Dallas, Independence being on a leg from the latter line. The circuits, Fig. 3, were somewhat modified by reason of the fact that, due to the small number of stations involved, and the short distance, it is found possible to ring through direct from any office on the line. In this circuit a means is provided at each switching station whereby the operator by plugging into the through switching jack causes battery current to be projected out by the line. This battery current serves to operate the through switching relays at Salem which connect the two lines for talking. Ringing is done directly in the usual manner, and at the termination of the call, the switch is released on the removal of the cord plug from the through switching jack. Two jacks are provided at both Dallas and Independence, Fig. 3, one the regular jack line, used for normal manual switching, and a through switching jack provided with extra contacts for connecting the split retardation coil to the line. The center of this coil is connected to battery, the current following the line to Salem and operating the switching relays.

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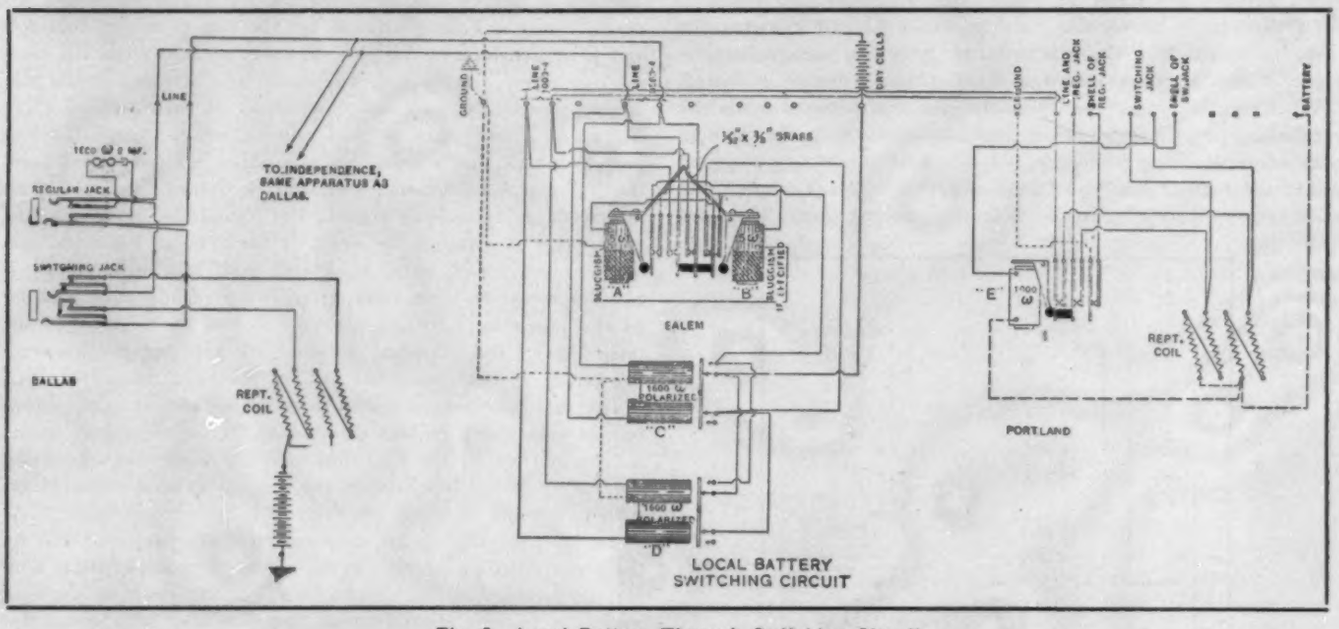

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Convention of Tri-State Independent Telephone Association

Wonderful Growth of Independent Telephone Organizations in South Shown by Presence at Sixth Annual Convention at Corinth, Miss., of Over One Hundred Men Prominent in Independent Telephone Work in Mississippi, Tennessee and Alabama—Report of Proceedings

By Clopton Thomas
Secretary Business Men's Club, Corinth, Miss.

The sixth annual convention of the Tri-State Independent Telephone Association was held at Corinth, Miss., on June 17. In many respects this was the largest and most remarkable convention of its character ever held in the South. It was the largest because there were in attendance over a hundred Independent telephone operators from the three states composing the association, as well as representatives of nearly all of the leading supply houses and it was the most remarkable convention of its character in that it illustrated the wonderful growth of Independent telephone organizations in the South, there being in attendance at this convention twice as many Independent operators as have attended any other previous convention.

The Waldron Hotel in the city of Corinth, an up-to-date and enterprising hostelry, was disignated as the official headquarters of the convention, and W. N. McAnge, Jr., general manager of the Stantonville Telephone Co., the local Independent company, was in charge of the reception commtitee, composed of representatives from the Business Men's Club and citizens of Corinth generally who were on hand to welcome the incoming delegates.

The Opening Session.

At 9 a. m., on Tuesday, the first day of the session, a meeting of the board of directors was held at the Waldron Hotel. At 10 o'clock the delegates repaired to the Elite Theatre, where the morning session was held. Hon. T. E. Henry, mayor of the city of Corinth, extended a welcome in behalf of the city, and Clopton Thomas, secretary of the Business Men's Club, gave the delegates a cordial welcome in behalf of that organization.

To these brief addresses W. H. Bryant of Mobile, the acting president, responded in behalf of the delegates of the association in a pleasing and appreciative style. This was followed by an illustrated lecture on "Automanual Telephone Practice," by E. C. Lewis, of Chicago. The lecture was illustrated by the use of moving picture slides and showed the automanual system in a most complete manner. Aside from the illustrations shown on the canvas, the lecture itself was a splendid presentation of the system and was enjoyed by every one who had opportunity to hear it.

The afternoon session was held at the club rooms of the Business Men's Club where the program previously arranged was carried out. The first address was that by J. C. Kelsey of Chicago upon the subject of "Local Financing of Independent Properties." This address went into detail upon the question so vital to every local telephone operator, dealing with the management, handling, and financing of local exchanges. Those present obtained a great amount of valuable information from the lecture which can be utilized in the conduct of their business.

This address was followed by Frank L. Eldridge, of Chicago, who discussed the Telephone Service Association and its work. Mr. Eldridge went thoroughly into all matters covered by the work of the association, showing its commercial, engineering and legal departments and its value to the individual operator in the every day handling of his business. He claimed that no telephone operator can afford to be without the service of this organization.

Short talks on technical subjects were taken up and R. E. MacDuff, also of Chicago, gave a very interesting talk on the advantages of using Paragon ground cones in telephone work. This talk was a technical dissertation on the economical method of handling service and giving efficiency to the operating plant by protecting the telephones from lightning. Following this F. A. Rader, of Chicago, discussed the question of economy and maintenance by the use of various types of carbon lighting arresters. This address was not only interesting in the extreme, but was presented in the most business-like manner, which appealed to the good judgment of every delegate.

The convention then adjourned to the Waldron Hotel where the members visited in a body the second floor of this hotel, which had been set apart for exhibits by the various manufacturers.

On Wednesday morning the convention assembled at the Elite Theatre where an illustrated lecture was given by R. M. Wagner, of Chicago, on the subject "Automatic Telephone Practice." This lecture was illustrated in detail by moving picture slides and was most interestng and nstructive in every detail. J. B. Shannon, of New Albany, Miss., deivered an address on the subject, "What the Independents Have Accomplished in North Mississippi." The address showed the great progress and development of the Independent system in the state of Mississippi, and portrayed in a pleasing and interesting manner the great developments which will likely take place in the future.

Election of Officers and Resolutions.

Following this the annual election of officers was held and W. H. Bryant, of Mobile, Ala., was elected president, J. C. Duncan, of Knoxville, Tenn., vice-president and W. N. McAnge, Jr., of Corinth, secretary. Other committees and officers were also elected.

The following resolutons were adopted:

That whereas, we have received at the hands of the Corinthians a most cordial reception and welcome,

Be it resolved; That the Tri-State Independent Association tender its sincere thanks to the Business Men's Club, and to Mr. Thomas especially; the mayor, Mr. Henry and the city authorities; the Daily Corinthian, the Corinth Herald; and to the people generally who by their courteous treatment have made us feel at home.

Be it further resolved: That we express our sincere thanks to the Waldron Hotel for it's treatment of the delegates.

Be it further resolved: That the Tri-State Independent Telephone Association approves the present course of TELEPHONY and encourages its members to read same.

Be it further resolved: That whereas the National Association's dilatory tendency is of such a nature as to cause us to think that in their present state, we while not condemning them, would prefer not to work with them,

until they at least show a spirit of co-operation for Independent telephony.

Be it further resolved: That we extend to W. N. Mc Ange, Jr., our thanks for the way in which he has handled the convention.

After completing its business the convention adjourned for the local entertainment during the afternoon.

Promptly at 1:30 p. m., a sufficient number of automobiles was lined up at the hotel to take the delegates on a visit to the famous Shiloh Military Park, situated on the Tennessee river, 22 miles from Corinth, the route being over the newly constructed turn-pike road connecting this historic place with the outside world. The pike has just been completed and is a high compliment to the energy and activity of the local citizens who have constructed it. The ride of 22 miles to the park, was delightful, passing through a beautiful section of the northmost part of Mississippi and a part of the state of Tennessee. At the park the delegates were driven over its 90 miles of gravel road constructed by the government, and were shown those historic battle fields of the Civil War.

The government has spent millions of dollars in preserving this famous park to future generations. It has marked with appropriate tablets every movement of the troops fighting there during the war and has erected beautiful and lasting monuments to the different regiments and troops who displayed such valor and courage on the battle fields. The park comprises 4,000 acres of land acquired by the government and, situated on the banks of the historic Tennessee River, constitutes one of the most famous parks in America. A delightful luncheon was served in the pavilion over-looking the river and everyone enjoyed to the fullest, the pleasant surroundings.

At 8 p. m., upon the return of the delegates from Shiloh Park, a smoker was held at the Waldron hotel which ended the program of the convention, after which the delegates departed for home filled with enthusiasm for their work in the future and with kind words for each other and the citizens of Corinth for their part in the entertainment accorded them during their stay.

Among the leading exhibitions was an automanual 100-line switchboard, the operation of which was explained by E. C. Lewis.

The Kellog Switchboard & Supply Co., of Chicago, was represented by J. C. Kelsey and S. M. Lewis.

Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., exhibiting telephones, switchboards and general construction supplies, was represented by J. B. Wilkinson, of Louisville, Ky.

Frank B. Cook, exhibiting protecting apparatus was represented by F. A. Rader, of Chicago.

The Paragon Sellers Co., of Chicago, exhibiting Ironite wire and telephone specialties, was representd by R. E. MacDuff.

The Electric Supply Co., of Memphis, exhibiting electric supplies, was represented by H. G. Mitchell, and W. A. Mounding.

The Commercial Electric Co., exhibiting electric supplies, represented by H. L. Brueck, its Southern representative.

John A. Roebling Sons Co., of Trenton, N. J., exhibiting bare and insulated wire, was represented by Thomas M. Hall.

The Automatic Electric Co., of Chicago, was represented by R. M. Wagner.

Among the prominent men who attended the convention were: W. H. Bryant, Mobile, Ala.; M. T. Durden, Yazoo City, Miss.; J. C. McCarthy, Guntown, Miss.; T. O. Rouke, Jackson, Miss.; E. C. Lewis, Chicago; C. O. Davis, Aberdeen, Miss.; H. L. Brueck, Jackson, Miss.; J. P. Caldwell, Shannon, Miss.; Dr. J. H. Stone, Tremont, Miss.; H. G. Mitchell, Memphis, Tenn.; H. S. Bonney, Buffalo, N. Y.; F. A. Rader, Chicago; J. B. Shannon, New Albany, Miss.; J. L. Bookout, Rara Avis, Miss.; H. J. Newbill, Tupelo, Miss.; M. D. Durbin, Adamsville, Miss.; F. W. Carr, Jackson, Tenn.; J. C. Kelsey, Chicago; S. M. Lewis, Jackson, Tenn.; Frank L. Elridge, Chicago; C. V. Sims, Trenton, Tenn.; Terry W. Allen, Jackson, Tenn.; R. E. MacDuff, Chicago; C. E. Moreland, Sherman, Miss.; Thos. N. Hall, Birminghan, Ala.; J. R. Wilkerson, Louisville, Ky.; J. C. Duncan, Knoxville; R. M. Wagner, Chicago; A. T. Fulghum, Selmer, Tenn.; Lacy Kendrick, Stantonville, Tenn.; F. S. Troxell, Meridian, Miss.; C. W. Priestly, Henderson, Tenn.; W. A. Mounding, Memphis and Dr. Oscar Copeland, Red Bay, Ala.

Wisconsin Commission Grants Authority to Raise Rates.

The Wisconsin Railroad Commission has granted authority to the County Line Telephone Co., of Tisch Mills, Wis., to increase its rates. The company's petition for the right to discontinue its rate of 25 cents per month per subscriber and substitute a rate of $4 per year per subscriber was approved.

The annual report of the company for the year ending June 30, 1912, shows 117 subscribers connected. The total earnings from operation were $347.25, and operating expenses $325.95, leaving $21.30 towards interest and depreciation. The cost of the plant is $5,443.94. The commission concludes that the revenues are not sufficient and adds:

"It is doubtful if a return of $4 per year will properly meet the expenses of the utility unless it is the practice of subscribers to make some additional payments in the form of labor or materials furnished."

Merger of Pennsylvania Independents.

Papers were recently filed at Harrisburg, Pa., attesting the merger of three Independent telephone companies under the name of the Huntingdon & Clearfield Telephone Co., with office at Clearfield, Pa. The merger unites the Indiana Telephone Co., chartered March 18, 1899, and having an authorized capital of $150,000; Cambria Telephone & Telegraph Co., chartered September 30, 1901, with an authorized capital of $200,000, and the Huntingdon & Clearfield Telephone Co., incorporated November 19, 1900, with an authorized capital of $500,000.

The directors of the three companies and of the merged company, which will have a capital of $850,000, are the same, being: A. W. Lee, president, John Wrigley and Singleton Bell, Clearfield; Rembrandt Peale, St. Benedict's, and H. J. Patton, Philadelphia.

New Secretary for New York Commission.

The Public Service Commission of New York, has appointed Frank H. Mott of Jamestown secretary. Mr. Mott is a practicing lawyer in Jamestown and at one time was a deputy attorney-general, serving during the years 1907-1908. In his practice as a lawyer he has had considerable to do with railroad, gas, electric and telephone matters. He studied law with Cook, Fisher & Wade of Jamestown and attended the Buffalo Law School, and has practiced law in Jamestown for 14 years. He was the Democratic candidate for secretary of state in 1902.

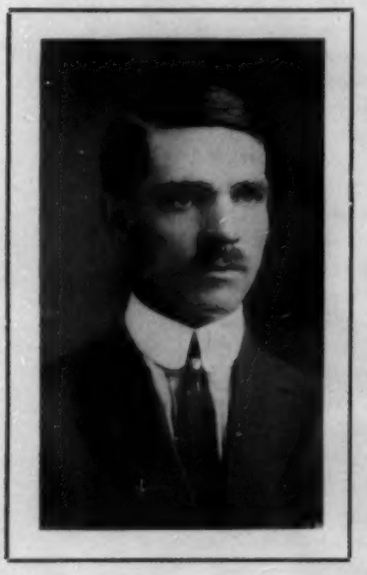
Suit for Overcharge at Oklahoma City.

Suit has been filed in the district court at Oklahoma City, Okla., in behalf of 250 patrons of the Pioneer Telephone & Telegraph Co. for the recovery of overcharges amounting approximately to $8 for each person. It is claimed the overcharge was made while the validity of the Oklahoma Corporation Commission's order holding that an attempted raise of rates was illegal, was pending a decision of the supreme court.

A Quartet of Men Prominent in the Telephone Field

WILLIAM C. MORRON, vice-president of the Columbiana County Telephone Co., Lisbon, Ohio, was born in 1860 and received his early education in the common schools and in the Lisbon high school. After leaving school he engaged in the mercantile business in Lisbon which had been established by his father in 1847. Mr. Morron entered the telephone business about 12 years ago as one of the original organizers of the Columbiana County Telephone Co. Prior to this time the town of Lisbon had been served for 10 years by the Bell company, which had 90 telephones in service. Ten months after the home company had entered the territory the new company had 500 telephones in operation with miles of farm lines and the entire county covered by feeders. Mr. Morron has served as director, superintendent and vice-president of the company. He is also active in other business enterprises, being president of the New Castle Real Estate Co. and president of the Grocers' Association of Lisbon. He is a Shriner, Knight Templar, 32nd degree Mason, Elk, Eagle and Owl.

WILLIAM FRANKLIN QUALLS, general manager of the Decatur County Independent Telephone Co., Greensburg, Ind., was born in Argos, Ind., in Nov., 1876, and graduated from the Argos high school in 1894. He took an electrical and mechanical engineering course by correspondence, and entered telephone service as groundman for the Plymouth Telephone Co., Plymouth, Ind., in 1894, and in 1896 built the Argos telephone exchange and sold it to other parties. He served as lineman, troubleman, plant inspector and wire chief with various companies and for six years was switchboard installer for the Central Union Telephone Co. in Indiana. He then became installer for the Stromberg-Carlson Telephone Mfg. Co. He was associated with the late Theodore Thorward at the time the South Bend Home Telephone Co. was organized and remained for three years as engineer. He became foreman of the Chicago Telephone Supply Co. and later went with the Western Electric Co. as installer. He went to Greensburg in September, 1906, and rebuilt the entire plant.



CHARLES RUBY MOORE, general manager of the Lafayette Electric & Mfg. Co., and president of the Electric Time & Mfg. Co., Lafayette, Ind., was born in Edwardsville Junction, Ill., in May, 1882. After graduating from high school at Windsor, Ill., in 1898, he attended Purdue University, graduating in 1907. He received B. S. degrees in both electrical and mechanical engineering, having made both courses in four years by special permission of Dean W. F. M. Goss and President Stone. He received the degree of E. E. in 1910. He served as assistant professor in electrical engineering at Purdue University and installed a large power house in southern Indiana. He was also designer for the Atlas Engine Works, Indianapolis. While at Purdue he also studied telephony. He took up engineering work with the Lafayette Electric & Mfg. Co. on January 1, 1913. He became manager of the company on April 1, 1913. Mr. Moore is an associate member of the A. I. E. E., Indiana Academy of Science and Sigma XI. He is a member of the Tau Beta Pi and Eta Kappa Nu. Mr. Moore is a Mason.

LESTER FULTON MERSHON, secretary and treasurer of the Turlock Home Telephone & Telegraph Co, Turlock, Calif., was born at St. Louis, Mo., in June, 1887, and was educated in the high schools of Dallas, Texas, the Arkansas Military Academy and the Metropolitan Business College. He entered the telephone service in the contract department in the Southwestern Telephone & Telegraph Co. at Dallas Texas, in 1906, but resigned his position to engage in newspaper work. Later he was employed in the general offices of the Texas Pacific Railway. He moved to California, where he engaged in newspaper work for one year, at the end of which time he accepted his present position. Mr. Mershon changed the mode of collections from using collectors to payment at the office of the company. This was accomplished by a plan which increased collections by the 10th of the month from 75 to 98 per cent of the statements sent out. Mr. Mershon is a member of the Turlock Business Men's Club, the Turlock Blue Rock Club and is a K. of P. and an Elk.

A June Decision

More About Commissions—Failure of Conjecture—Cost of Wild Goose Chasing

By J. C. Kelsey

One by one, the clouds which shadow the public weal are passing slowly by.

The breezy magnate who once bragged that he controlled legislators has taken to the tree tops.

It is now a sin for any politician even to speak to a corporation man—he is sure to have the finger of scorn pointed at him.

This is the predicament at Washington.

The administration, in its plans for a new currency bill, would naturally like to talk it over with Wall Street. But no one with political ambition can do anything but shy sticks at this down-trodden, patient beast called Wall Street.

Even the United States senators have had to confess that their ambitions regarding tariff are governed by their personal holdings.

Really, you can't blame a sheep-owning senator for conscientiously voting against free wool. Nor can a senator who owns a 5,000 acre plantation devoted to sugar cane, be expected to throw up his hat in honest enthusiasm for free sugar.

This is a pitiless age. At one time men were burned alive, women were buried and children tortured on the slightest pretext.

Today, the corporation man is jeered, gibbeted and garroted on every occasion.

Who will come to his relief? When will all this persecution stop?

This is surely the first victorious round in the peoples' battles with the self-elect. No wonder they enjoy it.

The United States Supreme Court handed down a decision most vital to telephone men. It happens to be a railroad case. I mentioned some of its aspects last week. It was really a battle over a two-cent fare.

Minnesota, particularly, was in the foreground.

The fight was more bitter there, because Minnesota is the home of that sterling believer in competition, James J. Hill. He preaches his fervent belief in it, but he won't have an Independent telephone even in his woodshed, much less in the Great Northern freight or ticket offices.

It has ever been queer to me that people will say things that they don't mean at all.

As in all rate reduction cases, the pivotal argument was along the line of the 14th amendment.

And the railroads failed to prove their case, and, of course, left the supreme court with nothing else to do but to ratify the state's order.

Neither railroads nor telephone companies have any right to assume that the courts or commissions have any private views, and that their representatives can leave anything to their imaginations.

The railroads failed, because a bunch of high-priced lawyers, who really had little time to learn the case, spouted and conjectured. I never yet saw a lawyer who was fully prepared when the case started.

In other words, they tried to put that late discovery, air castle value, over on the court and the court could not see it.

You simply have to hand it to the present supreme court. It will not take the place of congress. And it sharply reminds congress of its remission of duty.

So today, it is not really settled whether the railroads or the states have won a victory. Present indications reveal a victory for the state, and the permanence of the state commission idea.

It is not likely that the present congress, victorious with traditions of states' rights, will interfere.

It is possible, some day, that the Interstate Commerce Commission may have the power to alter a state commission's views, but not now.

The case of the railroads hinged on the value of land. The lower courts had allowed 30 per cent. excess value on land in some cases and 200 per cent. in others, particularly where important terminals exist.

Justice Hughes said that a railroad can not complain if it is allowed for its lands a fair average market value of similar lands in the vicinity.

Get it? "Of similar lands in the vicinity."

I once called your attention to the elevated railway people of Chicago, who seem to be the inventors of the air-castle value. They turned in a value of land around $28,000,000. It really was not worth more than $8,000,000.

The supreme court decision should give Chicago's city council some comfort, since it seems to have been amazed at that high land value.

The experts assumed that every foot of the land under the elevated structures was occupied by fine sky scraper buildings. The buildings had to be bought and then torn down! Of course, it ran into millions fast. You could as reasonably assume that each pole was of solid gold. But nothing seems to have any depressing effect upon a bunch of promoters.

The gist of the Minnesota decision is the recognition of state commissions.

It has been a curious mess. For instance, a certain railroad runs through Texas and Louisiana. The Texas commission ordered the railroad to do something.

And they carried their order into effect, even over in Louisiana.

Shippers in Louisiana objected to the palpable discrimination, and were backed up by the state commission.

The railroad refused to acknowledge the order of the Louisiana commission, claiming it was acting under the orders of the Texas commission.

The Interstate Commerce Commission took a hand and sat down hard upon the Texas commission. And the National Commerce Court sustained them and ordered the railroad to disobey the Texas order.

A scheme of this kind gives railroad companies and large interstate telephone systems a sort of no man's land, where they can carry on evil practices without restraint, because federal and state authority agree in one place and clash in another.

The Minnesota decision cleared this condition. In other words, it means that railroads and other corporate interests were disappointed in not having the hands of 48 state commissions tied behind their backs.

This case particularly appeals to telephone men.

Last week I covered considerable ground on the commission question, but the following lesson must be driven home; I will repeat from last week's issue:

"The 'cost of reproduction' method is of service in ascertaining the present value of the plant, when it is reasonably applied, and when the cost of reproducing the property may be ascertained with a proper degree of certainty. But it does not justify the acceptance of results which depend upon mere conjecture."

So said Justice Hughes in this important case.

Now this calls to mind the most intelligent and constructive thing the National Independent Telephone Association has ever done.

A committee of three men has been appointed to work upon reproductive values in telephone properties.

Here is a place to do effective work: Every telephone man should keep close account of costs and send them in to this committee. If you put up 2,000 feet of cable, keep accurate account and give the information to the committee.

Bear in mind Justice Hughes' admonition that no value which can not be proved with a proper degree of certainty can be used.

Ordinarily, the cost of things is a dry topic. But any man in the telephone business who can not see the necessity of knowing his costs, will have trouble ahead.

Commissions are here to stay. And they are going to be obeyed, too.

It is possible that there will be more suggestions of an $11 residence service such as the Pennsylvania commission has made.

I might say here, as I forgot to say last week, that I am in no wise to blame for that Pennsylvania $11 rate.

The time to prepare for war is not after the war begins, but before.

In a vigorous rate case, it will be little fun sitting behind a lawyer or out in front of him, and trying to keep out conjectural things.

You can't keep a lawyer out of conjectures to save your life; he lives on it. And you can bet that the lawyer will know more about the case in two days than you will ever know.

The court pays no attention to the lawyer. He knows his lack of information.

So in view of these conditions, we should not wait until the last moment to defend ourselves from a rate reduction order. Get busy with reproductive values that a court can understand.

You will have no difficulty in getting justice if you will work diligently.

I think I can see the day ahead when telephone conditions will be much more comfortable. And rates much higher, or expenses much less. You won't have to raise rates much to be in easy circumstances.

I have said a great deal about the deadly $1.50 and $1.00 combination—how, if these were wiped out, the more prohibitive charges could be lowered, and the cost of operating very visibly decreased by reason of less public interference.

It costs something to go to court, and to advertise, and control or resist public opinion.

I believe it costs the Bell company $7.50 per station to carry on a warfare which can be eliminated by proper commission control.

Supposing that $7.50 per station for 5,000,000 stations was saved; it would be quite a figure, and a comfort to minority stockholders.

And if the 4,000,000 Independents can save even $2.50 per station, that is $10,000,000 annually, that will go a long ways toward those missing dividends.

That is what clear-sighted commission control can some day accomplish.

Study, for a moment, the average performance of a Bell telephone, and compare it with one of your own company:

The Bell company earns

From rentals	$30
From tolls	10

The investment is practically

For rentals	$90
For tolls	50

The net earnings, after real productive charges have been paid, are

From rentals	$15.00
From tolls	6.67

After examining the performances of many telephone companies, I have found that it takes half of your rental receipts and one-third of your long distance receipts to pay actual productive expenses.

I believe this applies to the Bell company in any typical exchange.

If you examine closely you will find that the managers are sending to the central office just about this much expense report.

The next item is depreciation, which has to be deducted.

You will find that the Bell company is coming so close to that old familiar $4 per station per year for depreciation reserve, that you can't ridicule this item any more.

Charging $2.50 against rental usage and $1.50 against long distance usage, we have the final net earnings:

From rentals	$12.50 or 14 per cent.
From tolls	5.16 or 10 per cent.

But the Bell telephone company does not earn such a high rate of income, available for interest and dividends.

There is another charge yet to come—a sort of a wild-goose chasing charge—for lawsuits, fights over rates, publicity, advertising, all in an attempt to overcome hostile public opinion.

This leaves a real net earning which is borne out by the last annual report of the Bell company:

From rentals, $7, or 8 per cent. on a $90 local exchange investment.

From tolls, $3, or 6 per cent. on a $50 long distance investment.

In other words, practically $7.50 per telephone is wasted.

You remember Louis Brandeis made the statement that railroads were wasting $1,000,000 a day in false economy.

I believe the telephone companies are guilty of terrible waste, too. I believe that Independent telephone companies easily waste $2.50 per station on their wild-goose chasing—money that could be saved under proper conditions.

It is admitted by all that universal service costs more, even $5 per year, it is claimed, in some rate hearings.

It is possible that these statements, like the Brandeis statements, are somewhat exaggerated, but there is no use in denying the fact that millions of dollars can be saved to telephone stockholders.

I am digressing somewhat and possibly dreaming, but I could not resist the chance to show where we are wasting money in the telephone business.

It is caused by natural conditions. No one is accused of extravagance. It is our self-elected environments that cause the great expense.

If you will go back to the above figures you will note a subdivision all the way through between rental and toll charges.

The question of toll charges is before most every state commission. Who among you can intelligently separate his costs and state definitely whether or not the long distance business pays?

In other words, is the long distance rate too high? That is the question you will soon be compelled to answer.

I have often expressed my belief that if all charges are properly made, the long distance business does not pay as good returns as the local exchange business.

Do you actually know whether I am wrong or not?

Again I repeat, the state commission has been legitimatized.

You can't escape it. You will simply have to learn all about your business.

I have been giving you just enough figures to arouse your curiosity about your own business.

Averages say that 95 per cent of all business enterprises fail. What will keep this law from applying to the telephone business if you do not make a deep study of your own conditions?

MORAL: Do not depend upon conjecture!

Practical Subjects—Letters and Discussions

Bookkeeping System and Forms.

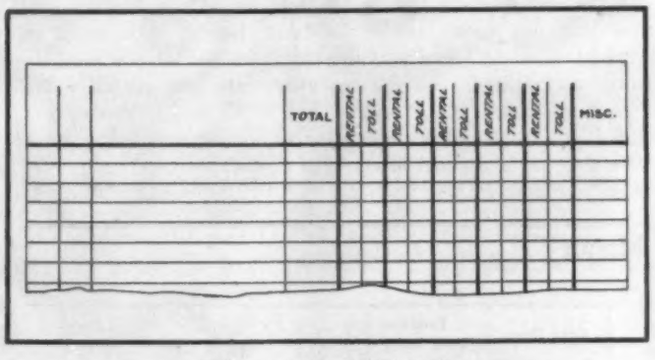
On the first of July we are to install a new system of bookkeeping. As it can be well adapted to all telephone companies whose earnings are around $25,000 to $30,000, a description of the forms may interest TELEPHONY'S readers.

The Enterprise Telephone & Telegraph Co., of New Holland, Pa., of which I am bookkeeper, at present operates five exchanges with 1,300 telephones.

With the new system we can at all times see what our rental and toll amounts to under each exchange, as well as what we are spending under each exchange.

We will keep a ledger for each exchange and one general ledger.

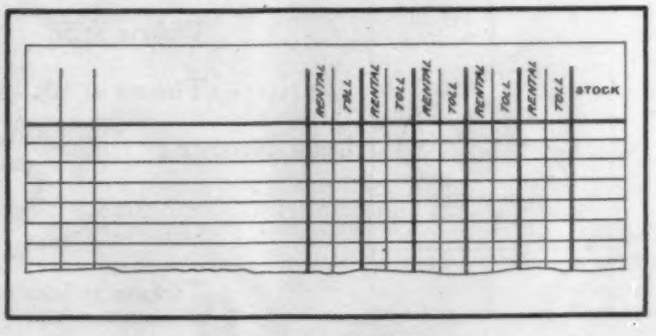
All subscribers' rentals and tolls will be charged in the day



Ruling of the Cash Book.

book and entered in the respective columns, rental and toll, and listed under the exchange in which they are located. These accounts are then posted to the exchange ledger where we can at all times see the subscriber's rental and tolls for each month.

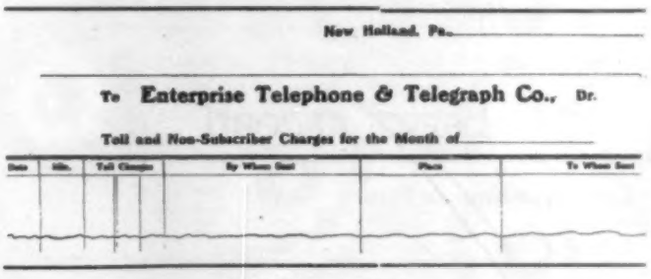
At the end of the month, the day book is footed up; the exchange's rental and toll are added and carried to the credit of rental and toll accounts in the second half of the exchange



Ruling of the Day Book.

ledger, where we can at all times see what each exchange has in rental and toll. Each ledger, except the general ledger, is divided into two sections, the first section from *A* to *Z*, for subscribers only, and the second section, from *A* to *Z*, for general receipts and expenditures, listed under their proper headings.

When a subscriber wishes to pay his rental, we enter it in


New Holland, Pa.

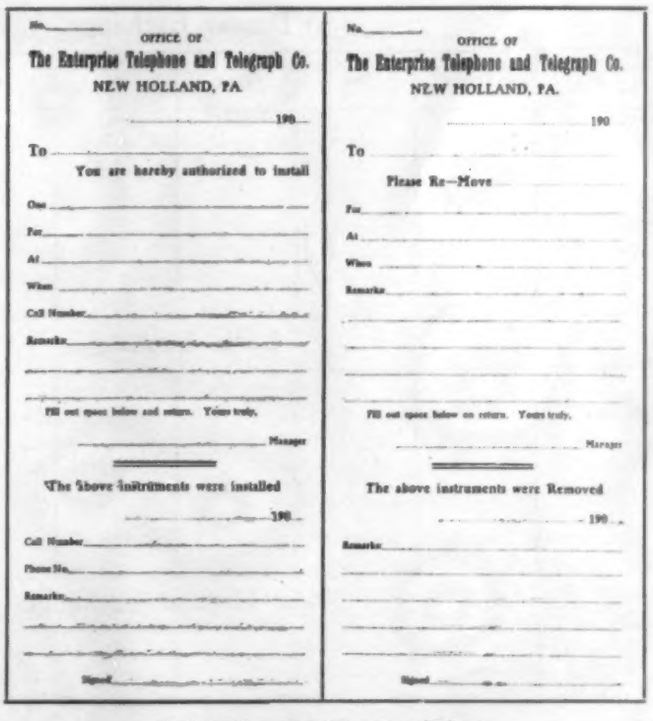
To **Enterprise Telephone & Telegraph Co.,** Dr.

Toll and Non-Subscriber Charges for the Month of

Date	Min.	Toll Charges	By Whom Sent	Place	To Whom Sent

Bill for Toll Charges.

the cash book, placing the amount under total, and then separate the rental and tolls to the exchange under which he is listed. The different spaces in the cash book for exchanges


No.

OFFICE OF

The Enterprise Telephone and Telegraph Co.

NEW HOLLAND, PA.

190

To

You are hereby authorized to install

One

For

At

When

Call Number

Remarks

Fill out space below and return. Yours truly,

Manager

The above instruments were installed

190

Call Number

Phone No.

Remarks

Signed

No.

OFFICE OF

The Enterprise Telephone and Telegraph Co.

NEW HOLLAND, PA.

190

To

Please Re-Move

For

At

When

Remarks

Fill out space below on return. Yours truly,

Manager

The above instruments were Removed

190

Remarks

Signed

Installation and Removal Orders.

are of no use, except a record of the rentals and tolls in the cash book at the end of six months should equal that in the day book, providing all rentals are paid up to that time.

TROUBLE TICKET.

Enterprise Telephone & Telegraph Co.

Exchange and Date

Trouble Reported to be

Name of Subscriber

Reported by

Received by

Time Reported

Time Cleared

Found to be

Name of Troubleman

No. of Hours Team

No. of Hours Self

Material Used

OFFICE RECORD.

Cost of Troubleman's Time $

Cost of Team

Cost of Material

Total Cost for Fixing Trouble

The Trouble Ticket.

If we must make a rebate of any kind, we can at all times tell what this amounts to under each exchange.

On the debit side of the cash book, we make our charges for all money spent under the proper head and exchange.

We keep a bank book in which are entered all deposits and all checks drawn. A cash balance is taken every night. The difference between the two sides of the cash book should equal the difference between the two sides in the bank book.

All material used, no matter what, has to be charged in the day book to the proper head under which it was used and

☞ This Bill is Due and Should Be Paid at Once.

New Holland, Pa.

To Enterprise Telephone and Telegraph Co., Dr.

For balance due for rental from previous statement $

For balance due for tolls from previous statement

For telephone rental for six months, beginning this date

Toll charges for June 191 as per itemized bill

" " " *July* 191 " " " "

" " " *August* 191 " " " "

" " " *September* 191 " " " "

" " " *October* 191 " " " "

" " " *November* 191 " " " "

Total due for rental and toll $

Received Payment

Rentals Must Be Paid in Advance as Per Contract.

Form of Semi-Yearly Bill.

under the proper exchange. At the end of the month, this is credited to the stock account in the general ledger, while all material bought is charged to stock.

At the end of each month we take off a trial balance and prove that our books are in balance. Every six months an inventory is to be taken and the net earnings for the past six months ascertained. All the accounts under the second index of each exchange, i. e., "rentals and tolls" and of money expended, is closed and brought over to the general ledger.

We also use a journal in connection with this set.

New Holland, Pa. Chas. F. Yost.

Month .....

Denver Exchange.

In	Thru	Out	Total	5c	10c	Long Dist.	Total Long Dist.

.....Tickets at 5c

.....Tickets at 10c

Long Distance

Leola Exchange.

.....Tickets at 5c

.....Tickets at 10c

Long Distance

New Holland Exchange.

.....Tickets at 5c

Exchange Record of Calls.

Letters From a Retired Lineman to His Nephew.

Podunk Valley Farm.

Dear Ben:

Yesterday afternoon Doc Stuver drove up to the house.

"Come, Dick," he said, "get up on your wooden horses and hobble out here to the buggy. We've got to go over and save Taylor's woods. Jim Porter's stubble field is on fire. My man is going to meet me with a tub of water and some blankets.

"You see, the fire started down back of the elevator, and I believe it would have burned itself out if it had been left alone. It spread quartering to the wind and it was bound to tie itself in a knot. But some idiot butted in and yelled 'back fire,' and they back-fired clear across the field, squarely in the face of the wind. Of course, it got away from them in a dozen places and now it's on the way for Taylor's brush fence, and then the woods will furnish fuel for the finish."

"Going to put out thirty rods of fire with a tub of water?" I asked.

"You're here to hold the horse," he assured me.

There must have been 20 men in the field, armed with picks, pitchforks, shovels, brooms, mops, etc. Most of them were about played out, too.

We drove to the center of the long line of fire. Doc got out, picked up a pitchfork, took one of the wet blankets from the tub and, hanging it to the tines of the fork by one corner, dragged it along over the blaze, leaving only a smoldering path behind. His man took the other blanket and started in the other direction.

In 15 minutes the fire was out. Doc climbed back into the buggy and we drove home.

"Dick," he said, "I've been telling these folks things for forty years, but somehow they won't understand. It's got so I have to *show* them."

Ben, it seems to me you are a little that way. You seem to have a knack of mixing up what you are told with your own ideas.

I think your instructions are generally explicit. It's all right to want to know why they want a thing done a certain way, but if you haven't grey matter enough in your head to reason it out, don't criticize the plan and offer a substitute of your own.

I guess they are doing well to send you out to the mountains. You'll find some leeway there for the exercise of your bent to devise improved methods. There are places in the Rockies where the snow covers up the poles during the winter and sometimes takes them away when the slides begin in the spring.

The rocks themselves are cast loose occasionally and carry away everything in their path. You'll find the top of one pole on a level with the butt of the next. Grading and guying rules are cast to the winds. You'll use dynamite by the ton, and you'll be surprised how many snakes you can shake out of the crevices with every explosion.

Dynamite is not the safest stuff in the world to handle, but its danger is greatly exaggerated. The people in the mountains are not afraid of it. Nothing but a jolt or blow will set it off. Accidents usually happen through misunderstanding.

Down in Missouri one of our gang dropped a digging bar into a hole in which the dynamite had been placed, but not tamped. He didn't notice the wire. Fortunately, he wasn't hurt much.

The greatest danger is from inquisitive onlookers. They are liable to fool with the magneto box, or the wires, and in some cases handle the dynamite if they get a chance.

We were not troubled that way in building through Missouri. We had a red wagon marked "Dynamite" on both sides, and a gray mule. Old John, who drove the wagon, considered the mule more dangerous than the dynamite. He bought a fly blanket and painted "Dangerous" on both sides of it.

He had the road all to himself. The natives would take to the "tall timber" whenever they heard John coming. You could hear him long before you could see him, as he sang continuously in a thunderous tone. John usually sat on a box of explosives behind the driver's seat, as he claimed "Fanny," the mule, had a habit of shooting her heels back over the seat when things didn't go to suit her.

When we came to the end of the line, we had 18 sticks of the stuff left. Our instructions were to destroy it. Ever stop to think how easy it is to destroy dynamite? At first we decided to bury it, then concluded that would hardly do. Then we were going to explode it down by the river, but didn't have but two caps, and didn't care about setting off nine sticks in a bunch.

Old John proposed tying the stuff to the gray mule's tail and let her kick it to smithereens—that's how much confidence he had in Fanny. Finally, however, Old John said he'd burn it. He said it was the easiest way to get rid of it. Only you've got to be careful not to have snappy wood or coal in the fire. You can't set the stuff off with fire and you can't light it to burn with a match.

Old John got a lot of waste paper, took his dynamite and went to a vacant lot back of the telephone exchange. He wasn't bothered with company. He wrapped each stick with paper separately, then piled them so they would not slip or fall. Over them he piled the rest of his fuel, set fire to it, lit his pipe with the same match and sat down near by. The stuff formed a yellowish-green flame with yellow smoke.

After the fire burned out we asked Old John why he didn't come away instead of staying so close. He said there were three reasons: There wasn't any danger; any fool might come along, stir the fire with a stick and set the stuff off, and then he said he had a state license to blow himself up.

As I told you I bought a herd of goats. They are not such a worthless breed of animal as I have been led to believe. There is a market for them the same as sheep. Their hair is salable the same as wool. They are easy keepers. I bought them to kill off ten acres of hazel brush and undergrowth. Have fenced it in so there isn't much but brush for them to eat. Even at that they say leaves tempt them more than grass. I am told there are places where they rent out goats for the season to kill brush at so much per acre.

Folks have begun to come here after cats, but they don't have any luck keeping them. They are bound to come back home. They could take the kittens and keep them, but they don't want to wait for them to grow to rat-killing size. Doc says the next generation won't be of any use, as the race degenerates if no new blood is brought in. He says I'd best get a bulldog to drive them off the place, now I've got well rid of the rats.

Little Ben, your namesake was given a pocket knife the other day and he just came in with a considerable of a cut on his hand. Julia, of course, has confiscated the cutlery.

Uncle Dick.

Telephone Lines in Kootenai National Forest.

The work of installing three important telephone lines will soon be started in the Kootenai national forest, to connect with headquarters at Libby. The new line will serve to put the headquarters in direct touch with the greater part of the forest. The total length of the new lines will be approximately fifty miles. The work in connection with forest fires will be greatly facilitated when the system is completed.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities, and Actions of City Councils Bearing Upon Franchises, Rates and Service

Supreme Court Dismisses Appeal of City of Paducah, Ky.

The United States Supreme Court, granting a motion of the East Tennessee Telephone Co., has dismissed as premature the appeal of the city of Paducah, Ky., from the injunction issued by Judge Evans of the federal court at Louisville, preventing the city from interfering with the telephone company's poles and wires upon the streets or with the conduct of its business. Justice Lurton who delivered the decision of the court, reviews the matter as follows:

From the bill it appears that a controversy has arisen concerning the legality of a tax in the nature of an annual rental for the privilege of maintaining upon the streets the poles which had been placed there by permission of the city many years before, and also as to the character and duration of the permission under which the telephone company or its predecessor has placed and maintained the poles and wires upon the streets for the conduct of a telephone system. It also appears from the bill and its exhibits that, for the purpose of settling every question at issue, an agreement was made between the parties whereby the terms of a new ordinance were settled upon, under which ordinance the telephone company was to purchase a franchise at public sale, if it should be the highest bidder, the terms of which should be according to those arranged between the city and the company, which terms were not to be enacted into an ordinance by the council. The company upon its part agreed to pay to the city in full settlement of the controversy as to the pole rentals which had been imposed, and of all other questions, a certain sum, and to dismiss its litigation concerning the same. The company made the payment and it was accepted by the city.

An ordinance was thereupon passed which granted to the company the right to maintain its poles and wires upon the streets for a term of 20 years, and imposed conditions as to the maximum charge for telephone service, which the company claims were radically different from those which had been agreed upon, and which the bill avers were so unreasonably low as to prevent a profitable conduct of its business. For this reason it refused to accept the ordinance and reverted to its original rights under the permission theretofore referred to, and such other rights as had resulted from its long occupation of the streets with its poles and wires with the acquiescence of the city. Thereupon the city council passed certain ordinances and resolutions which gave certain notices which the bill claims constituted an impairment of the company's contract and due process clauses of the constitution of the United States.

A temporary injunction was granted against any action by the city interfering with the continuance of the company's poles and wires upon the streets and conduct of its business as it had theretofore been carried on.

Mr. Justice Lurton relates further that the city then denied it had made any agreement with the telephone company and denied its authority to have made such an agreement, but admitted the receipt of payment and tendered the return of this with interest. After a final hearing the lower court upheld the telephone company, but in issuing an injunction specifically stated that such an act did not deny to the city the right to make lower rates than those existing in Paducah or to regulate the setting of the poles and the stringing of the wires. Without enacting such an ordinance or declaring its intention not to do so the city appealed.

The Supreme Court then adds:

No time within which the city was to elect to pass the ordinance carrying out the contract, which the court held it had made with the telephone company, was set by the decree. If that had been done the mere failure (of the city) to take action within that time might well be held as a conclusive reaction of the option to carry out the agreement and would have the effect of making final the decree maintaining the precontract status. This right to elect will remain open and until exercised or renounced by the city will leave both parties in a state of suspension as to their rights and duties until further action is had.

Owensboro, Ky., Loses Suit in Supreme Court.

The United States Supreme Court has handed down a ruling that the city of Owensboro, Ky., is without authority to cancel the franchise of the Cumberland Telephone & Telegraph Co. in that city despite the city's allegations of failure by that corporation to fulfill its contract with the city. The decision by a vote of five to four, Justices McKenna, Day, Hughes and Pitney dissenting, affirmed the action of the federal court in Kentucky enjoining the city from enforcing an ordinance to oust the company from the streets.

Joint Telephone and Telegraph Contracts in Kansas.

The Kansas Railroad Commission has authorized the Missouri & Kansas Telephone Co. and all other telephone companies in the state, to enter into contracts with the telegraph companies in the state for the joint transmission of messages over telephone and telegraph lines and has further ordered that all telephone companies that have rates filed with the commission, must enter into contracts for joint service upon request of the telegraph companies.

The joint service order means that in cities and localities where there are no telegraph offices, or where there are only day offices, messages may be telephoned to the nearest open telegraph office, and the message must be sent in due order, as though it had been filed at the office, at the regular telegraph rate, plus the following reduced telephone rates:

Full telephone charges where the regular telephone toll rate is 10 cents for the first three minutes; 80 per cent. of the usual telephone charge where the rate is from 10 to 15 cents for the first three minutes; 70 per cent. of the usual telephone charge where the regular toll rate is 20 to 25 cents for the first three minutes; 60 per cent. of the usual telephone charge where the regular telephone toll rate is 30 cents or more for the first three minutes.

Wisconsin Commission Orders Rate Readjustments.

After a rehearing the Wisconsin Railroad Commission has revised its order of Nov. 12, 1912, governing rates of the Western Crawford County Farmers' Mutual Telephone Co. The action in the present case was brought by the Union Telephone Co. against the Western Crawford County Farmers' Mutual Telephone Co., the People's Telephone Co. and the Farmers' Telephone Co., of Lancaster.

The commission's order of last November provided that patrons of the Western Crawford company who were able to call Prairie du Chien directly and to be called from that central, should be charged for service, either directly or through the company of which they were patrons, at the rate of $2.50 per telephone per year, and that a charge of three cents per message should be established on all messages to or from Eastman and Bridgeport or beyond, to compensate the Union Telephone Co. for its service in switching these messages.

Considerable dissatisfaction was felt over the way this order worked out. The railroad commission's new order provides as follows:

"Section 1. The Union Telephone Co. shall charge three

cents per message for switching service, for all messages over the toll line from Prairie du Chien to Eastman, or from Eastman to Prairie du Chien, without regard to the point of origin or destination of those messages beyond the Eastman switchboard, except as noted in Section 3 of this order.

"Section 2. The Union Telephone Co. shall charge five cents per message on all messages passing over the toll line from Prairie du Chien to Bridgeport, or from Bridgeport to Prairie du Chien, subject to the same regulations as specified in Section 1 of this order.

"Section 3. On all messages from Prairie du Chien to points on the lines of the People's Telephone Co., the Union Telephone Co. shall charge three cents in addition to the rates mentioned in Sections 1 and 2, which charge shall constitute what is known as an "other line" charge, which shall be paid to the People's Telephone Co. to compensate that company for handling such messages. For all service rendered to the Western Crawford County Farmers' Mutual Telephone Co. or to its subscribers, or to other companies or their subscribers from whom messages coming to Prairie du Chien are handled over the lines of the Western Crawford County Farmers' Mutual Telephone Co., the Union Telephone Co. may bill the Western Crawford County Farmers' Mutual Telephone Co. of the individual subscribers as it sees fit."

The order is made effective immediately.

Wisconsin Senate Passes Bill to Regulate Competition.

The Wisconsin senate has passed, under suspension of rules, a bill introduced by Assemblyman E. J. Kneen, of Bangor, radically revising the regulations for competing telephone utilities in Wisconsin. The vote on passage was unanimous. The bill now goes to the governor. Assemblyman Kneen is a telephone man.

The principal clause in the bill stipulates that where a telephone exchange already exists, another telephone utility which may desire to build or extend an exchange in the same municipality shall file a notice of such intention with the Wisconsin Railroad Commission. If, after due investigation, the commission finds that public convenience and necessity require additional service, the commission is authorized to grant a certificate to build.

The bill amends subsection 1 of section 1797m-74 of the statutes, relating to competing public utilities, and adds thereto instructions relating to physical connections between telephone systems. The bill reads as follows:

"Section 1. No license, permit, or franchise shall be granted to any person, copartnership or corporation, to own, operate, manage or control any plant or equipment for the conveyance of telephone messages, or for the production, transmission, delivery or furnishing of heat, light, water or power in any municipality where there is in operation under an indeterminate permit, as provided in sections 1797m-1 to 1797m-109 inclusive, a public utility engaged in similar service, without first securing from the commission a declaration, after a public hearing of all parties interested, that public convenience and necessity require such second public utility. This sub-section shall not prevent or impose any condition upon the extension of any telephone toll line from any municipality into or through any municipality for the purpose of connecting with any telephone exchange in such municipality or connecting with any other telephone line or system.

No public utility already engaged in furnishing telephone service, shall install or extend any telephone exchange for furnishing local service to subscribers in any municipality where there is in operation a public utility engaged in similar service, without first having served notice in writing upon the commission and any other public utility already engaged in furnishing local service to subscribers in such municipality, of the installation or extension of such exchange which it proposes to make, or make such installation or extensions if the commission, within twenty days after the service of such notice, shall, upon investigation, find and declare that public convenience and necessity do not require the installation or extensions of such exchange, except that any public utility already engaged in furnishing local service to subscribers within any city or village may extend its exchange within such city or village without the authority of the commission.

Any public utility operating any telephone exchange in any city or village shall, on demand, extend its lines to the limits of such city or village for the purposes mentioned and subject to the conditions and requirements prescribed in section 1797m-4 and 1797m-30.

Section 2. This act shall take effect and be in force from and after its passage and publication."

Commission Hearing at Mitchell, S. D.

At a recent hearing at Mitchell, S. D., before the South Dakota Railroad Commission regarding telephone rates in South Dakota east of the Missouri river, 125 telephone companies were represented. The hearing was an investigation into alleged charges of discrimination in telephone rates as between stockholders and those who are not; into extra charges for delivering toll messages on local exchanges and rural lines; respecting alleged discriminations in switching charges, connection fees and terminal charges and discriminations in furnishing free telephone instruments and telephone service in connection therewith.

More than two-thirds of the managers were placed on the witness stand and were questioned with reference to their methods of making connections for parties living on rural lines and those living in the city. It developed in the examination that it has been the custom of many companies to permit farmers living on the rural lines to have connection with city phones without charge, but if persons residing in the city desired to talk with those in the country a charge of 10 cents was made. It was stated that discrimination was made by permitting one telephone company to make connections with an exchange and imposing a charge of another.

A similar hearing for lines west of the river was held at Rapid city, S. D.

After the commission secures all the evidence and it has been gone over thoroughly it is believed that rules and regulations will be made by the commission which will harmonize the telephone charges of the state, and put the business on more uniform basis.

Ask Pittsburg Receivers to Explain Charges.

Judge Robert S. Frazer of the Court of Common Pleas at Pittsburg, Pa., has granted a petition of counsel for four stockholders of the Pittsbug & Allegheny Telephone Co., asking for a rule requiring William Flinn and Joshua G. Splane, receivers of the telephone company, to show cause why permission should not be filed to take exception to receivers' fees of $51,000 and their counsel fees amounting to $20,000 referred to in their first report issued on May 1 and covering the period from Jan. 10, 1911, to March 13, 1913.

The petition was filed on behalf of D. P. Reighard, J. V. Ritts, Elizabeth Kenworthy and F. H. Steele who hold over $150,000 stock in the telephone company. Notice of the filing of the petition was given in a local paper, and the petitioners allege they had no knowledge of the filing of the report, as they do not read the paper in which the notice was given. The petitioners allege that they believe the fees are excessive.

Montana State Officials File Rate Complaint.

Formal complaint as to rates for telephone service at the Montana capitol building at Helena, Mont., has been filed with the Montana Public Service Commission against the Mountain States Telephone & Telegraph Co., by Governor S. V. Stewart, Attorney General O. M. Kelly and Secretary of State A. M. Alderson. As members of the board of examiners they charge that the state is being discriminated against by the company in charging the maximum rates for telephone service at the state capitol building. It is stated that the commission is expected to order a general investigation of telephone rates charged cities, counties, private individuals, and the state.

A Description of Constantinople's Telephone System

United States Consul General at Constantinople, in Report to this Government, Recounts how Franchise was Granted Anglo-Franco-American Syndicate—Details of Contract with Ottoman Government—Character of Service and Annual Rates for Service

By Consul General Oscar S. Heizer

The concession for the Constantinople telephone system was put into adjudication in 1909, and the 14 competing syndicates were eliminated one by one until finally there remained only the Anglo-Franco-American group (composed of the Western Electric Co., the British Insulated & Helsby Cables Co., the Thompson, Souston Co., of Paris, and the National Telephone Co.), to which the government granted the concession in April, 1911, after it had been accepted and ratified according to Ottoman law. Before granting the concession, however, the advisability of the system being constructed by the government itself was considered, but it was finally decided that it would be more practicable to grant the concession to a group of foreign telephone companies with the privilege of purchasing the property at a later date.

The concession is for 30 years from the date of the signing of the contract. Under its terms the government grants to the concessionaires the exclusive right to construct and operate telephone lines within certain districts, with the exception of state, municipal, and lines entirely within private property, which have already been installed. It was stipulated that the plans and estimates of the company were to be submitted to the government within six months and the system was to be completed and in operation within one and one-half years after the acceptance by the government of the plans and estimates.

All materials to be used in the original construction work are allowed to enter free of duty, after examination by a government commission as to their quality and adaptability. As soon as the system is in operation the government will proceed with the preliminary inspection; and after it has been in operation for one year, the inspection to determine the government's final acceptance will take place.

Payments to Government and Right to Purchase.

In return for granting the concession, the Ottoman government will receive 15 per cent. of the gross profits of the operating company. A feature which has not hitherto been a part of concession of like nature granted by the state is that the Ottoman government, besides participating in the gross profits, will also receive from the telephone company $3.35 a year for each mile over which lines are operated and $4.06 for each square yard of property occupied by the company buildings. Within six months of the signing of the imperial firman the concessionaires were to organize a joint-stock company subject to Ottoman laws, with an initial capital of at least $1,100,000 and bearing the name of Société Anonyme Ottomane des Téléphones de Constantinople.

According to the terms of the concession the government has the right to purchase the property 10 years after the signing of the imperial firman. If, however, the government has not taken the property over at the end of 30 years, the concession will be prolonged for another 10 years under the original conditions of the contract. The company will have the right to employ foreign technical experts during the first 10 years of the concession, but it will be required to send Ottoman subjects to Europe for technical instruction and, furthermore, to establish a telephone school at Constantinople to be maintained for the same purpose.

The causes whereby the concessionaires would be liable to the forfeiture of the concession are, excepting force majeure, the following: Failure to present the plans and estimates agreed; failure to undertake the work of construction at a stipulated time; the abandonment of the work; the interruption of service over any one of the three central exchanges during a period of five years or longer; and the nonfulfillment of one or more of the obligations of the concession. In the event of the occurrence of any of these, three successive notices at intervals of three days will be sent to the company by the government authorities, and if the former does not comply with the requests of the government within a period of 10 days after the issuance of the last notice the concession reverts by forfeiture to the latter.

Districts and Stations.

If construction continues as rapidly as it has up to the present time, it is hoped that telephone communication will be opened over all the lines by August, 1913. The service will cover both the European and the Asiatic sides of the Bosporus and of the Marmora as far as Pendic on the Asiatic coast and San Stefano on the European coast, and will also include the Princes Islands in the Marmora about 10 miles from Constantinople.

There are to be 16 central offices, one main exchange each for Pera, Stambul, Kadikeuy, and 13 substations located on the Princes Islands and at various points along the Bosphorus. The Pera station, which is under construction in Rue Tom-Tom opposite the Austrian consulate general, will cover all points in Pera and in Galata up to Couroutchesme; the Stambul station, also under construction, will operate over the Turkish quarter of the city as far as Ali Bey Keuy on the Golden Horn; and the station in Kadikeuy will cover Scutari, Moda, Kadikeuy, and other points on the Asiatic side of the lower Bosporus.

The 13 substations are located as follows: Bebek, Therapia, and Buyukdere on the European side of the Bosphorus; Erenkeuy, Candili, Pasha-Bagtche, and Kartal, of the Asiatic side; Makrikeuy and San Stefano on the European shores of the Marmora; and the islands of Proti, Antigoni, Halki, and Prinkipo, which compose the Princes Group.

Cables—Companies in Charge of Construction.

Up to the present time, out of a total of 205 kilometers (127.4 miles) of cable, which will cover an area of 300 square miles, 15 kilometers (9.3 miles) have been put in place. The construction work will consist of both underground and aerial cables, according to the district through which the wires pass. The cables will be dry core paper insulated, the underground ones being drawn into cast-iron pipes, bonded through all manholes and chambers, and the aerial lines being drawn into metal rings which are clamped to the steel-strand suspender wires, this latter idea being copied from recent American practice. The cables contain 500 to 600 pairs of wires and are made

in lengths of 200 to 800 meters (656.2 to 2,624.7 feet), according to the size of the cable and the most economical shipping lengths.

The construction work has been turned over to an English and an American company; the British Insulated & Helsby Cables Co. (Ltd.), of Prescot, England, is furnishing the materials and equipment for the outside work, and the Western Electric Co., of Chicago, is supplying the interior apparatus.

The technical staff of the company, which now consists of 30 men, all of whom are foreigners, will be replaced by natives as soon as the system is in good working order. About 500 natives are employed by the contractors in laying the cables and in doing other outside work.

Subscribers and Rates.

Up to the present 2,900 subscribers have been secured —1,200 in Pera, 1,200 in Stambul, 200 in Kadikeuy, and 300 at other points along the Bosporus. It is of interest to note that 25 per cent. of these subscriptions are for Turkish private dwellings. Another interesting feature of the Constantinople telephone service is the fact that, owing to the many tongues spoken in Constantinople, all the telephone operators will be required to know at least three languages—French, Turkish, and Greek—and there will be in each central exchange operators who speak German, English, Armenian, Spanish, and the Slav languages as well.

The company's rates are divided into two schedules, (1) for commercial, industrial, and transportation companies, stores, etc., and (2) for apartments and private dwellings. To the first class of subscribers two kinds of service are offered:

(1) For a central line, with the right to 275 conversations, a minimum of $12.10 per semester is charged; for messages in excess of 275 per semester the rates are $2 for 50 conversations, $6.60 for 150, $11 for 250, and on up to $44 for 1,450 excess conversations. For 1,450 to 1,950 excess messages the rate is $2 per 100 conversations; 1,950 to 2,450, $1.60 per 100 conversations; 2,450 to 2,950, $1.20 per 100 conversations; above 2,950, $1 per 100 conversations.

(2) For a private switchboard with two or main trunk lines and interior branch lines running to different parts of the subscriber's establishment, the cost of installing each central line is $8.80 per semester, and for each branch, $2.20 to $3.30, according to the number of booths. The charge for service with a private-switchboard installation is: For a minimum of 1,500 conversations, $26.40 per semester; 1,500 to 3,000 conversations, $1.60 per 100 messages; 3,000 to 4,000 conversations, $1.40 per 100; 4,000 to 5,000 conversations, $1.20 per 100; above 5,000 conversations, $1 per 100 messages.

Subscribers in the second category may choose either a central line, with the privilege of 250 conversations, at a minimum rate of $11 per semester, and charges for excess messages that range from $3.60 for 100 conversations to $28.60 for 1,000 conversations, the rate above 1,000 being $2 per 100 conversations; or a flat rate of $17.60 per semester for a central line with unlimited service in the same district.

Zones—Reimbursement for Unused Service.

The zone of telephone lines is divided into two districts —the European district, and the Asiatic district, which includes the Princes' Islands. For each conversation from one district to another flat-rate subscribers are charged an extra tax of four cents.

The duration of all subscriptions is for one year. In case the subscriber has not used all the conversations which he has purchased in advance for the year, the company will reimburse him for all such unused conversations above the minimum number allowed.

A Talk on Public Relations.

At one of the meetings of the Springfield, Greenfield and Pittsfield chapters of the Telephone & Telegraph Society of New England, Third Vice-President E. K. Hall, in a talk on public relations, discussed the system of arbitration which exists between the public and the New England Telephone & Telegraph Co., and showed that whereas in most controversies each side picks an arbitrator, the public alone has anything to say as to the selection of arbitrators in its relations with the telephone company.

The system is not as dangerous as it sounds, however, for, in the speaker's experience, the public is willing and anxious to be fair to the company, and will fail to be so only when ignorance of the business, lack of confidence or prejudice poison its decisions. It is, therefore, vital to the company that none of these states of mind be allowed to grow in the public's mind, and it is the work of every employe to help toward a full understanding and co-operation.

As both the public and the company intend to treat each other fairly, and as it is to the interest of the public that the company prosper, and that it shall remain in such a financial condition that it can extend its operaions and give the service that the public wants, no possible ground exists for conflict between the two.

Mr. Hall said that the employe can do much to dispel the popular ignorance which exists in regard to the telephone company, both by taking every opportunity of showing the community of interests existing and by proving that the company is not of the grasping type of corporation which has given such a bad name to "big business."

Then, too, the public must be shown that in such a complex installation as a telephone system, perfection of service cannot always be expected. When a man sees a street car stop because a tree has fallen across the track, he does not blame the traction company, but when anything is wrong with the telephone, the impatient customer cannot understand any reason for it, and blames the company for gross carelessness. And yet by his contract, he has secured, if he lives in Springfield, the right to use 20,000 double-track connections at any time of the day or night.

The only possible breach between the company and the public is the fear that the company may be making an unreasonable profit on its investment, but when it is realized that only 7 per cent. is paid, it is hard to see where there is any room for complaint.

After teaching the public all that they can, the employes have the duty of creating in the minds of the public such confidence that the people as a rule will be willing to have faith in the company. This cannot be done by waiting until a man is in trouble before attending to his complaint. So far as possible employes must get out and anticipate trouble. And when a case comes up that demands special treatment it should not be held over for the routine to catch it up.

The convenience of the client and not that of the company should always be sought, and people should be treated better than they expect to be if a right condition of the public mind is to be created. Too often the company loses strength by failure to keep in mind this fundamental relation, and to use team play. The company stands in a three-cornered relation to the public, the stockholders and the employes, and the three must be harmonized.

Railway Telephony—Practical Points in All Branches

A Regular Department Which Appears Semi-Monthly—Scope Includes Principles of Construction, Testing, Operation and Maintenance—Columns Open for Contributions on Matters of General Interest to Those Engaged in This Branch of Telephony

Efficiency in Operation of Telephone and Telegraph.*

By John H. Finley.

TRAIN DISPATCHING CIRCUITS.

To describe in detail the operation or circuits of all of the various manufacturers for this class of service is beyond the scope of this article but a few typical instances will illustrate them.

One manufacturer uses a signaling circuit as outlined in Fig. 15; another, a circuit as shown in Fig. 16; and the New York Central Lines a circuit as shown in Fig. 17.

The telephone circuits for a long, heavily loaded, party line of this kind was as much of a problem as the signaling circuits. While all of the circuits now in use are efficient, each manufacturer believes he has hit upon the only one, and recommends it as superior to all others. This indeed is in most cases a fact, but what each gains in one particular is lost at some other point, so taken altogether the question is largely one of choice and price.

Now that the telephone engineers are ready to meet the newly awakened and ready-to-be-shown telegraph experts,

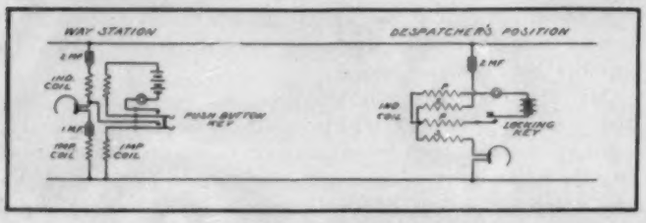


Fig. 15. A Booster Transmission Circuit.

who are going into the telephone game as one step in advance, large improvements may result in the future. Train dispatching by telephone has come to stay, and the adoption of circuits for railroad work is still in its infancy. In the next few years, if nothing happens to retard the progress, remarkable improvement in operation and equipment will be seen. The last word in either is still a long way off, and competition is the only thing that will bring out the good points. But at present, out of the mass of material at hand, one is able to select any one of three or four makes of equipment which meets, to a remarkable degree, the severe service demands made upon it.

On long party lines or long distance lines there are almost an innumerable number of ways to study economy by utiliz-

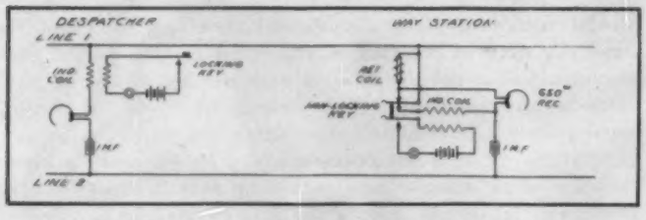


Fig. 16. Western Electric Transmission Circuit.

ing the wires to the fullest extent, improving the calling devices to eliminate time and errors and reducing the efforts required to make the call, thereby reducing the expense of each call.

In exchange work all the factors entering into the subject should be considered and the most economical apparatus to maintain and operate should be shown rather than the cheapest in first cost. It is a poor investment that will not pay interest and depreciation and a good round profit.

In the matter of help get the best all along the line and make each one, from the office boy up, feel his personal respons-

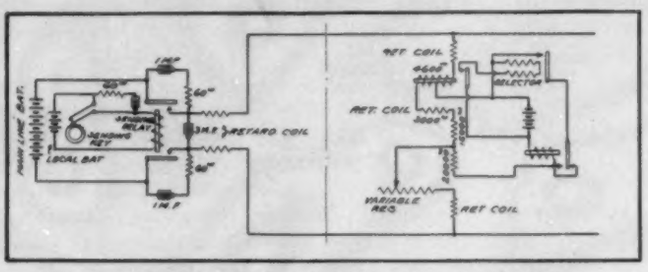


Fig. 17. Signaling Circuit of the New York Central.

ibility for every task assigned. Use as few inspectors of men as possible, but use the best maintainers of equipment obtainable.

In the railroad telegraph offices and wire chiefs' positions, the same law of help holds true, only in a more real way, for in a system reaching over several thousand miles with division headquarters and important offices at a number of different points, efficient help is imperative. No amount of inspection will in any real sense take the place of it.

Inspection and training of help is necessary, but the training should be emphasized rather than the inspection, and the responsibility should rest upon the man performing the task after he has been trained, and not on some one employed to watch him. Some of the best men are spoiled by this latter method.

A Wire Chief.

By J. A. Kick.

A wire chief is the master hand between the construction and operating forces of a telephone or telegraph wire plant. High standards of construction will not prove sufficient to the operating department. Neither can unusual operating methods overcome losses sustained from inefficient maintenance under the direction of unskilled wire chiefs.

The duties of a wire chief are exacting and at the same time fascinating, as a large part of his work consists in directing action based upon deductions from indications of conditions existing at great distances from his point of observation.

Imagine a wire chief directing a lineman to take a train to a certain point, thence by team to pole No. 11545, and then to be finally notified that the break in the wire was only five or ten poles from the pole indicated. One then has an idea of a common everyday occurrence. Certainly error in listing would cause unnecessary expense and delay to the service, but it is the required accuracy that lends the fascination to correctness.

The field for wire chiefs grows better each day. This is not difficult to understand when one considers the increase in special telephone and telegraph mechanisms, such as selective signaling telephone circuits, and printing telegraph systems.

A single line telegraph system is not difficult of main-

*Concluded from issue of June 14.

tenance, but at the same time it is readily agreed that it can be more efficiently operated if the maintenance is under skilled hands.

The position of railway wire chief should be very attractive, as it carries with it possibilities of promotion to dispatcher and thence upwards through the line of operating officials.

Business of all departments must to some extent be handled over the telegraph and telephone wires, and a thinking wire chief can, in a short time, become well acquainted with the general methods of the various departments and, by his actions in emergencies, demonstrate his capacity for bigger things. Skilled wire chiefs have been known to generally rehabilitate wire plants with little or no extra expense. To do this they have properly directed the efforts of maintenance forces which had previously worked without results, due to improper direction and lack of systematic action.

The ability and methods of a wire chief have a great deal to do with the efficiency and development of maintainers. Let the wire chief intelligently direct and the maintainer becomes interested in and studies his methods. Directing officials cannot but appreciate that the old methods of maintenance are no longer effective and are giving more attention to developing high class maintenance methods under skilled wire chiefs.

Operators and maintainers are eligible for the position of wire chief, and it is the aim of officials to promote from their own organization. All operators or maintainers cannot hope to be wire chiefs any more than they can all hope to be dispatchers, but until one has tried hard to become worthy of such promotion, it is folly to apply for entry to the "Down and Out Club."

Ability to hold a higher position does not often fail to develop in a man who has proved his ability to become a high class wire chief, for to become such he must have natural ability to direct men and handle material.

From the wire chief's standpoint, the telephone and telegraph business never before presented such a bright prospect for the future as it does at this time. Mechanisms are becoming more numerous and complex, standards are higher and as a consequence men qualified for the positions are very near the level of the next advancing step.

Among operators who do not rise to the wire chief's position are two entirely opposite classes. While the members are not entirely hopeless cases, they need awakening before making progress.

To one class belong the men who look upon the wire chief's work as a form of legerdemain which is so mystifying as to forever keep them afraid to attempt its mastery. In another class will be found men who, through ignorance of the finer sense of responsibility, have a contempt for the so-called mystery and thus never progress.

The man who is continually doing research work may cover the same ground that thousands of others have in detail, but there is always a little knowledge to be picked up by such workers.

When an operator continually complains that he does not receive promotion to wire chief, a little investigation will reveal the fact that he has not been willing to acquire the necessary knowledge, but has expected the position to come to him by right of service term or good fellowship.

Automatic Accessories in Manual Telephone Exchanges.

At a joint meeting of the British Institution of Electrical Engineers and the French Société Internationale des Électriciens held in Paris the latter part of May one of the papers presented was one prepared by W. Slingo, of the British Post Office, on the subject: "Automatic Accessories in Manual Telephone Exchanges." Among the promising developments of mechanical switching devices, says Electrical World, were mentioned the following: (1) apparatus for evenly distributing traffic over a number of operator's positions; (2) a device for improving the transmission conditions on "B" positions where more than one call wire is terminated; (3) equipment for selecting and isolating outgoing call wire circuits in cases where several call wires are used for operating a very large group of junction circuits.

The paper described details of selective apparatus for distributing traffic. On groups of outgoing call wires between busy exchanges trouble has been experienced as a result of confusion during the busy periods owing to operators interrupting each other and also owing to the delay caused by "A" operators in finding slack call wires. To remedy this a mechanical device known as an outgoing-call selector is given each operator. When she depresses her call-wire key the switch rotates until the wipers find an idle "B" wire to which the "A" operator can pass her call.

In the discussion which followed the presentation of this paper G. H. Nash mentioned the difficulty of differentiating between the kinds of service mentioned by Mr. Slingo, since the operator does not know who is the calling subscriber. To make provision for this he proposed a signal lamp board arranged to be visible over the entire exchange. He also pointed out that the operator should save about one second per call where the traffic distributor is employed, and that in consequence the equipment of the operator's position might be increased by three or four cord circuits. The next step would be to wipe out the multiple altogether.

Chicago Leads New York in Telephone Development.

That Chicago leads New York in telephone development, in so far as the ratio of telephones to population is concerned, was declared by Alonzo Burt, vice-president of the Chicago Telephone Co., in the course of a talk before members of the Electric Club, of Chicago, at a recent luncheon.

"New York has only 100,000 more telephones than Chicago, despite its greater population" said Mr. Burt. "In a few years there will be 1,000,000 telephones in Chicago. There are now about 400,000, including the suburbs. The increase will come through the increased uses which are being discovered for the telephone. They are becoming used in boats, on railroad trains, and in many other ways which are being almost daily."

A good form of organization is the first factor in the formula of success of a corporation, according to Mr. Burt. On this subject he said:

"Pick out any one of a few good types when you incorporate your company; see that you have proper coördination of the various units; teach the units what they should do, and you are on the high road to success. Capitalization is important, and without sufficient funds any company will fail. But many companies with poor organization fail, even if they have unlimited funds at their command."

Earnings of a Minnesota Company.

At a recent annual meeting of the Nicollet County Telegraph & Telephone Co., which operates exchanges at Cleveland, Gaylord, Gibbon, Kasota, Lafayette. New Sweden, Niollet and St. Peter, Minn., Secretary C. W. Carpenter reported total receipts of $59,242 during the year with operating expenses of $57,625, which included the cost of a new exchange at St. Peter amounting to $30,403.

The Telephone Inspector and the Troubleman

Continuation of a Series of Articles Begun in the September 7 Issue of Telephony—They Deal in an Elementary and Explicit Manner With Many of the Problems Encountered by Telephone Men in the Operation of Small Exchanges

By A. E. Dobbs

Meanwhile the girls had been instructed to ring every line with just a touch at the ringing key, in order to find the open lines, as open coils, grounded carbon blocks and crossed lines are all the natural accompaniments of a thunder-storm.

"Say, Mr. Risk," said Will, "why are we wiping off these blocks?"

"Because," he replied, "a lightning discharge sometimes, in passing from one block to another, loosens up particles of carbon dust, which lodge in the air gap and ground the line. We have frequently had to go out several miles to a country toll station, simply to clean out dust from between the carbons."

The Manager Tells Will a Few Things.

"Why, I should think that would be a regular nuisance."

"So it is, but we cannot get along without it," the manager replied. "A little trouble is cheaper than a fire in an exchange, and the carbon block style of arrester is quite satisfactory. Before it was used I have known of small exchanges to have from 20 to 50 drops burned out nearly every time a storm came along, and even of exchanges being burned out entirely by currents that these blocks would have shunted to ground."

"But would not the fuse protect it?" questioned Will.

"A fuse is no protection against lightning, because lightning cannot be stopped by two inches of air space, and besides, it has gone by before the fuse melts, though 'tis true that lightning often melts the fuses. The fuse, however, cuts out trolley and lighting currents, against which the carbon blocks are very little protection, but we depend upon the carbon blocks to shunt lightning. For that reason we put carbon block arresters in the cable boxes, because we want to keep lightning out of the cables if possible, though some of it does get through occasionally to be caught at the carbon arresters inside.

"A good many managers use copper instead of carbon blocks in the arresters. The air gap is wider, so that they do not operate quite as quickly as the carbon blocks. They are especially adapted for cases where there is considerable static on the lines due to close proximity to high tension power leads or other causes. Then some companies use them on their rural lines in order to save the troubleman going out over the lines after each storm to clean the blocks. I am rather doubtful as to the wisdom of using them on those lines on account of the larger air gap, but there is no doubt that the lines are freer from grounds due to dust between the blocks."

"Could not some plan be devised for throwing all the lines to ground in a storm?" asked Will.

"Yes," responded the manager, "but that would shut down the exchange, which is not necessary. The other plan is practically just as good, because if lightning comes in the arrester grounds it, and if a trolley or lighting current, the fuse cuts it out. It also sometimes happens that the arresters ground trolley and electric light currents. That depends, of course, upon the air gap and the voltage or pressure of the current.

"There have been mechanical devices designed to open and ground circuits in such cases, but telephone men generally have not regarded them as very satisfactory.

"You can see," he concluded, "that we have found very few of these carbons which show signs of arcing. But outside, the case will be different."

By this time they had finished the inspection of blocks, fuses and heat coils inside the building. They then went outside to the cable boxes and repeated the performance, George making tests and locating the trouble that the girls had found. The storm had been a severe one, and it was hardly to be expected that no drop coils would be burned out in an exchange of nearly 500 subscribers. But so efficient was the protective system which George had installed that only two of them rung open

The subscribers' instruments, however, did not escape so easily, for quite a number of ringer coils were open, as were several of the induction coils. It seemed strange to Will that lightning should attack an induction coil, which is out of circuit when the hook is down, so he asked George about it. The latter explained it by saying:

"You must remember that the impedance offered by a ringer coil is very high, while that of an induction coil is rather low. As lightning discharges are supposed to be alternating in character, it seems to jump across the open contacts in preference to going through the ringer coils. Or we may suppose the charge to be split up into several different branches, and that the wire in the induction coil being finer than that on the ringers, is more easily ruptured. When lightning burns out a coil, the break is nearly always in the outside layers, showing that it does not penetrate deeply, but that the damage is done by its leaping across from one turn to the other.

"With a trolley current, however, the effect is just the reverse, because the heating is more gradual, and the inside layers, not being exposed to the air to radiate their heat, suffer the most."

Where the break was in the outside layers of the coils, it was repaired by taking off a few turns and putting the coil back. But quite a number had to be removed and replaced with other coils, and in spite of all that the three of them could do, it was well into the next forenoon before the trouble was all cleared up. A high wind had accompanied the storm, but the same breeze that shook crosses in, shook them out again. The work that had been recently done, greatly helped matters, so that there was little line trouble.

As for Will, he worked hard trying to redeem himself for his flunk during the storm, for which a boy of his limited experience in trying situations, could really not be blamed. George, when he came to think it over, saw that he was wrong and made amends by helping Will more than usual with his work. Will had learned that George had at times a very sharp tongue. But at the same time, as he was such an all around good fellow, and never asking any of his men to work harder than he, himself, and always trying to make their work as easy as possible, he was quite popular with employes and patrons alike.

Trouble in Other Towns.

The same storm that made so much trouble for the Independence exchange also made trouble for two smaller towns connected with it, and it was necessary for someone to visit them. In order to study these somewhat, and find out what was necessary in order to prevent a recurrence of like troubles, it was decided that George and Will should go over, clear the trouble, and report.

(To be concluded.)

Physical Valuation of Property as a Basis for Rate Making

Questions as to What Shall Be the Proper Manner of Arriving at Physical Valuation and What Constitutes a Fair Rate of Return—Methods Used in Valuating Property—Items Involved in The Total Cost of Reproduction

By W. W. Anderson
Electrical Engineer, The Lloyd-Thomas Co.

In view of the large amount of rate agitation and legislation and the rapid spread of commission control of public service enterprises, the question of arriving at a standard uniform system of establishing rates is one deserving our earnest consideration. In dealing with this question, there has been no well defined policy or line of procedure established, either by the courts or by the various commissions. There are certain general trends, however, which forecast to a degree the policies that will be followed. Among these principles the valuation of the property as a basis for rates seems to be fairly well established, as it is of common consent that a public utility is entitled to earn a fair return on its investment, and any rate that does not earn such a return would be set aside by the courts as confiscatory.

Taking the valuation of the property, therefore, as a basis for rates, we still have the questions as to what shall be the proper manner of arriving at this valuation, and what constitutes a fair rate of return on the valuation. It seems that commissions have been somewhat in conflict on both of these questions. It is evident that each case, as it comes up, has a number of individual merits which must be settled accordingly.

The methods which have been most universally used in arriving at this valuation are: The original cost, outstanding securities and the cost to reproduce.

The general trend at present seems to favor the cost to reproduce as the proper basis, inasmuch as it represents the necessary investment to furnish the service required. Furthermore, it is difficult, and in many cases, impossible, to obtain original costs. Moreover, there has been considerable legislation towards eliminating all property except that which is necessary to furnish the service required of it. Since the cost to reproduce not only becomes the basis for rates to the consumer, but is used as a basis on which to compute the returns to the investor, it is important that the methods used in arriving at this value should be carefully studied.

The various items which enter into this value are often quite complicated and must be given special consideration for each case. Thus in valuing a certain piece of property, if it is found that a conduit line, for example, was built before the street was paved, the line would be more expensive to reproduce on account of the street being paved later. The valuation allowed, nevertheless, should in general be the reproduction value. There are likewise a number of other important matters of this nature, encountered in each piece of property which can be determined only by a close study of local conditions by those competent to judge.

The items of value to be considered in determining the total cost to reproduce are: The cost of the material in place, overhead charges, plant development, and going concern value. The first item of value represents what might be termed the contract price and is the amount which represents the cost of material, labor, and contractors' profit but does not include the expense to which the owners would be placed in the way of supervision, architects' fees, engineering, incorporation fees, taxes, insurance, placing stocks and bonds, interest on the investment during the construction period, and other expenses.

These expenses are usually computed as a percentage of the contract price and are arbitrary amounts which are apt to be different for each class of property, especially the charges for engineering and interest during the construction period, which can only be determined from an exhaustive study of the local conditions surrounding the property to be reproduced. Thus in figuring interest during construction on a telephone property, for example, it would not be fair to allow the same rate on subscribers' station apparatus as it would on real estate as in the latter case the investment would be made at the beginning of the building period. Consequently, the length of time of the investment would be longer before returns were received, and the rates of interest should be higher than that on subscribers' station equipment, which would be installed but shortly before returns on the investment started.

The item of plant development can only be determined from a study of local conditions. In arriving at this amount the size of the property under consideration plays a very important part. If the plant is a large one requiring a construction period of, say, five years, it is fair to assume that certain parts of the plant erected in the first or second years would have to undergo changes due to lack of information at the time of construction, changes in plans due to municipal requirements, temporary work in order to give service, and a great many other minor considerations. On a smaller plant requiring a year or two to construct, it might be that no such changes would take place during the consideration period and consequently, no item of this nature should be allowed.

The item of going concern value, or the cost to reproduce the business, is one requiring considerable knowledge of local conditions as well as skill in determining the proper amount to include. It, like plant development, depends to some extent on the size of the plant, and includes such items of expense as returns on the investment in the early periods of development, securing subscribers and, in the case of telephone properties, directory charges, and other similar items.

By summarizing these costs in order to obtain the total cost to reproduce we have, first, the contractors' price, which includes the cost of material in place and contractors' profit; second, overhead charges, including organization, legal, engineering, brokerage, interest during construction, and other minor incidental expenses; third, plant development, which covers the cost of making unforeseen changes during the construction period; fourth, going concern value, which includes the cost of establishing and placing the business on a paying basis.

The rate of returns on the investment allowed by the various commissions, have had a range of from 5 to 8 per cent. with nothing very definite established. It seems on the whole that the legal rate of interest for the state will become the basis. It is worthy of note that the general tendency of commissions has been to encourage public utility enterprises by allowing both a liberal valuation and a liberal rate of return on the investment.

In the Rural Line Districts

Some of the stockholders of the Cuba Northwestern Telephone Co. have built a new line from Will Cameron's to Cuba. The new line has been called the "Farmers' Friend."—Route No. 1 Item, Canton (Ill.) Register.

A. S. Lindstrom, Secretary and W. H. Travis, General Manager of the Glenn County Telephone Company, have bought 640 acres of land two and a half miles west of Germantown for an almond orchard.—Sacramento (Calif.) Bee.

Jas. Watchorn has moved on the Herbert Dexter farm. Herbert has gone to Montfort to take charge of the telephone central. Many of the neighbors helped him move, not because they wanted to get rid of him, but they loved him. Sorry to see him go. His sale was a success.—Brenton Item, Fennimore (Wis.) Times.

A new telephone company has been organized, known as the Star line, with nine subscribers. The poles have been tarred and hauled into place and will be erected at once. The line runs down the Tipton lane, across the Baldock and Bagley lands. Each subscriber will build his own stub.—Chalmers Item, Macomb (Ill.) Journal.

James Danley with six others have arrived to rebuild the telephone lines at Baraboo. Others will come soon and it will require several weeks to complete the work. Several cars of poles have arrived and other material is on the ground.—Baraboo (Wis.) News.

Freedom Gates, manager of the Farmers' Telephone company, has improved the appearance of the office by having it neatly papered and painted. He goes on the theory that cleanliness is next to godliness and puts his belief into actual practice. Would that we had more like him.—Hopkins (Mo.) Journal.

The Lynd telephone company has ordered another carload of poles. The poles have been set in town this week and the wire will be strung very soon.—Lynd News Marshall (Minn.) Messenger.

The new telephone posts have all been installed and the company is very busy working and soon the village will have a "real" telephone system.—St. Cloud Item, Plymouth (Wis.) Report.

The Bell telephone company is erecting new poles all over the streets of Cedar Bluffs.—Cedar Bluffs Item, Fremont (Neb.) Tribune.

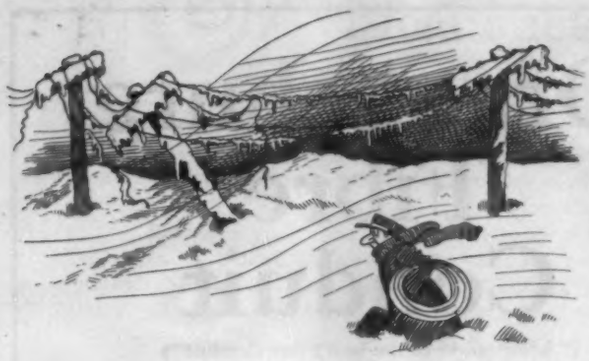
A. L. Crowder, head manager of the line work of the Galt Telephone Co. finished a new line last week for the company from Half Rock to Harris, which is a toll line. Mr. Crowder keeps on the hustle.—Trenton (Mo.) Tribune.

DID YOU SEE THAT BEAUTIFUL GIRL WHO APPLIED FOR A POSITION YESTERDAY? THE BOSS' WIFE TURNED HER DOWN
YES THAT WAS MISS PEACHY — THE MEN ALL RAVE OVER HER
IT WOULD TICKLE ME TO DEATH IF THAT TELEPHONE MANAGER WOULD TAKE ME UP ON THIS PROPOSITION. GOSH! HOW I WOULD LIKE TO GET RID OF THIS BUNCH OF OLD MAIDS
YOU TOLD ME TWO YEARS AGO VIOLET THAT YOU WERE ENGAGED
I WAS BUT HE — HE WENT BACK ON ME FOR SOME REASON — HE NEVER DID EXPLAIN
Brandenburg

Petoskey telephone operators will not be running away and getting married at the six-a-month-clip they seem to have adopted, if the suggestion that a business man in Grand Rapids gave to the local manager is taken. The manager isn't anxious to adopt the plan because—well, read the letter:

"Dear Sir: I recently noticed in the Grand Rapids newspapers that you're shy of telephone operators because six girls quit in a month to get married. If that is the case, I should be glad to lend my services in helping you solve the problem. My wife picked out every one of the twelve stenographers I employ. As man to man, I'm here to tell you that you can have all or any of them. Each is guaranteed unmarriageable."

The manager will not tell who sent him the letter.—Petoskey Dispatch in Grand Rapids (Mich.) Evening Press.



Sleet Don't Sound

half as bad now as it did six months ago —or as it will in another six months.

But *now* is a good time to think of it; for it will make you cooler now, and keep you warmer later.

If you string No. 12 copper wire this summer, the poor lineman is going to spend chilly nights repairing breaks and you are going to spend twice as much money as you should.

No. 14 Copper Clad Steel Wire is twice as strong as No. 12 copper—so the lineman stays in bed—and costs half as much as No. 12 copper—so half the money stays in the bank.

And when it sleets, your subscribers can stay home and telephone, for

No. 14 Copper Clad Steel Wire stays up

Trade Mark "Weld Clad"

Duplex Metals Company

Chester, Pennsylvania

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853 Peoples Gas Bldg.

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We Guarantee
Greatest Efficiency
Longest Life
Most Satisfactory Service
Lowest Cost of Up-keep
In the Use of our wire.

Write for FREE SAMPLE
Make Test and Comparison

Approved by Leading Institutions of Technology and Telephonic Science. Handled by most representative Jobbers and Supply Houses.

Indiana Steel & Wire Co.
Muncie, Indiana.

Three Types of Top

Carbon Clip Cap

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RED SEAL
Dry Batteries

GUARANTEED --- Not solely for laboratory requirements but to please you in actual service. Penny and hour tests make Red Seal friends.

Manhattan Electrical Supply Co.

MESCO

New York Chicago St. Louis 'Frisco

Please tell the Advertiser you saw his Announcement in TELEPHONY

Carrying 30 feet 3-inch socket joint conduit.

Orangeburg Fibre Conduit

("Admitted to be the best Fibre Conduit")

Made in FOUR STYLES OF JOINTS

Socket, Sleeve, Screw and Harrington

WITH BENDS AND FITTINGS FOR SAME

Is the lightest conduit made

and means low freight and cartage costs

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MAIN OFFICE AND FACTORY
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McClary-Jemison Machinery Co., Birmingham, Ala.
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Los Angeles, Cal.
Seattle, Wash.
Salt Lake City, Utah.

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THE BROWNELL SYSTEM
of Interchangeable Unit Office Fixtures

Shipped knocked-down and assembled with a screwdriver.
All styles of telephone booths.

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C. H. BROWNELL
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After putting one booth to competitive tests—a large eastern Independent telephone company placed an order for 25

Acme Folding-Door Booths

The "ACME" conclusively demonstrated its superiority over other folding door booths—it proved decisively that **it is the best booth for pay stations**, because it is the only folding door booth of **full double sound proof construction.** It is the only patent door that requires **no space between door and door frame**—it is the only folding door that **operates without rollers, tracks or channels**—it is the only folding door protected by a U. S. patent and it will give years of service, requiring no maintenance expense. It is artistic, attractive, inviting—a most excellent addition to your present arrangement of fixtures—it's a booth you will be both **wise** and **proud** to use.

The "ACME" invites the scrutiny of engineers—it is glad of the chance to make good.

Literature giving prices and particulars gladly sent upon request.

ACME CABINET COMPANY, 335 Broadway New York, N.Y.

From Factory and Salesroom

A Connector for Battery Cells.

A connector for joining two or more cells of a battery, which has features that appeal to the practical man, has recently been placed on the market. As shown in the illustration, the connector consists of a piece of insulated copper wire about six inches long, having a split cord tip on each end. A spring is placed in the tip in such a manner as to force the two parts to an extended position. When attaching the binding post of the battery cell, the two parts of the clip are sprung together

The Spring Lock Battery Connector.

so that the hole in the center of each easily slips down over the binding post. As soon as released, the two parts tend to separate, thus making a firm connection with the binding post, independent of the thumb nut.

The clip is manufactured by the Fitzgerald Mfg. Co., Torrington, Conn., which also manufactures another type of connector having a corrugated tip so that the thumb screw of the binding post is certain to make contact with the thumb nut when it is tightened.

Portable Car Telephones of Lafayette Company.

The Lafayette Electric & Mfg. Co., of Lafayette, Ind., which makes an efficient and up-to-date line of telephones, switchboards and can top terminals, is now devoting a great deal of time and attention to portable car telephones.

C. R. Moore, general manager, formerly connected with the electrical engineering department of Purdue University, has charge of the company's experimental and engineering departments. Anything that the telephone trade may want in the way of special apparatus can be made by this company.

The sales department is under the management of R. E. McCarty, whose training and ability fits him well for the place.

International Motor Truck, a Trophy Winner.

The International Harvester Co. of America has issued an interesting circular to celebrate the splendid work which the International Motor Truck did in the recent motor truck reliability run instituted by the Washington Post. The circular shows a view of the truck that won the trophy by finishing the 288 mile course over the mountains of Pennsylvania and Maryland with a perfect road score. In the rigid technical examination after the run, the International Motor Truck was not penalized a single point.

"Central Energy" and Local Battery Telephones.

Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., has issued two neat and comprehensive 20-page pamphlets, Nos. 41 and 42, the former showing the company's improved and complete line of standard central energy telephones and the latter showing the standard local battery telephones, wall and desk and combination telephone types.

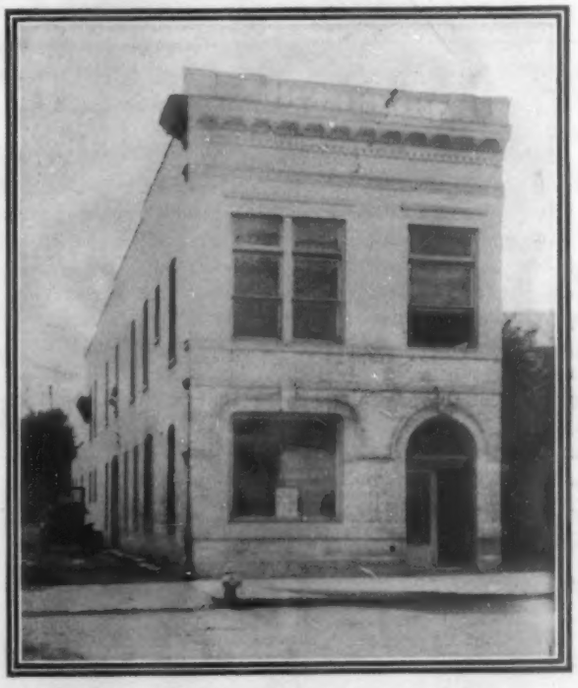
The company has adopted a new method of coding telephones for the purpose of simplifying the editing of orders and describing standard telephones of similar types. The numbers under which the different types of instrument have become well known through advertising, have been retained, and the variations in a given type are designated by a letter affixed to the type number.

The pamphlets contain descriptions of new types of telephones, namely, the No. 1126 type wooden residence for central energy systems, and the No. 896 type harmonic magneto telephone.

City Spends $10 Per Capita for Telephone System.

Rushville, Ind., a beautiful city of 5,000 inhabitants, has the benefit of an automatic telephone system that cost over $50,000 or more than $10 per capita for every man, woman and child. Rushville is declared to be one of the cleanest little cities in the Middle West and has many miles of paved streets. The people are all of one mind in the demand for the best in local improvements and it is said that if a man aspires to office in that city he must first show how he stands on the Home telephone proposition. If there is any doubt about his loyalty he goes down to defeat.

George H. Glass, general manager of the Citizens' Telephone Co., of Pekin, Ill., writes TELEPHONY concerning a recent visit to Rushville, where he has a force of men placing the Rushville plant underground. He states that the plant of the Co-Operative Telephone Co., of Rushville, is a strictly up-to-date automatic plant of some 1,100 subscribers and is growing rapidly under the management of George H. Davis, superintendent, and W. J. Jackson, secretary and manager. The company owns its own building, a two-story concrete structure, modern in every particular. The charging apparatus consists of duplicate gas engines and two generators located on the basement floor. The company owns a splendid motor car and also a motor cycle.



Building of Co-Operative Telephone Co., Rushville, Ind.

Everything is maintained in good condition; there is a place for everything and everything is in its place.

The company is now spending something like $40,000 in putting its main leads underground. Everything contained in the specifications is declared to be of the very best material. The cable used is Roebling's double wrapped paper insulated lead-covered cable, with 1 per cent. antimony, in the sheath. For

outside terminals, the F. B. Cook No. S 16 with full protection, and Cook's No. 10 for inside, are used. The aerial cables are supported by Siemens-Martin double galvanized messenger strand. The system is in every way of high grade and a credit to a progressive city.

Book Review.

INDUSTRIAL COMBINATIONS AND TRUSTS, by William S. Stevens, Ph. D.; published by the MacMillan Co., New York; 593 pages; price, $2.

The book is an attempt to place before the reader an impartial presentation of the problems that have arisen with trusts.

An endeavor has been made to publish a volume containing material, much of which is either too difficult of access or else altogether unavailable. A second purpose was to present the historical development of the trust movement and to give a thorough, comprehensive idea of the problems which the country is facing today.

The chapters of the book include such headings as: Specimens of early pooling; representative trusts; legislative opposition to the trust; judicial attack on the trust; the holding company; formation of the United States steel corporation; factor's agreements; international agreements; the patent monopoly; methods of competition and restraint of trade; recent trust decisions; methods of dissolution; efficacy of dissolution; and proposed methods of dealing with the trust problem.

The chapter on trust methods is particularly interesting, giving as it does excerpts from government investigations and other documents in various suits brought by the government under the Sherman act.

The chapter on the methods of dealing with the trust problem gives the views of certain prominent men, which are fairly representative along two lines of thought, one looking to government supervision, and the other to competition as an ultimate solution of the problem.

All of the matter contained in the book is useful in giving the reader an excellent understanding of the subject. The brief notes of the author add greatly to the value of the various citations and documents given in the volume.

Paragraphs.

MATHIAS KLEIN & SONS, Chicago, Ill., have issued a circular illustrating and describing the Eichhoff combined take-up and pay-out wire reels for electric light, telephone and telegraph line work. These reels may be installed on standards, on push carts, hand cars or auto trucks or the reel may be clamped to a telephone pole, tree, or any convenient post. The reel has an adjustable wire guide and one man can coil up wire without assistance, which means a large saving in time and labor in handling wire. The reel is manufactured by Walter E. Eichhoff, South Pasadena, Cal., and by Mathias Klein & Sons, Chicago.

STROMBERG-CARLSON TELEPHONE MFG. CO., Rochester, N. Y., has sent out to its friends a useful advertising novelty in the shape of a patent lead pencil and box of reserve leads. The white handle carries a reproduction of the company's well known Independent shield trade mark and other advertising matter calling attention to the fact that the company has put out more than 2,000,000 telephones and leads with 8,000 exchanges. It makes telephones for every kind of service and switchboards for systems of every size.

New District Manager for Chase Motor Truck Co.

E. M. Denton, formerly an agent for the Chase Motor Truck Co., in Baltimore, Md., has just been appointed district manager in place of C. K. Thomas, resigned. Mr. Denton takes charge of his new office about July 1. For the present he will make St. Louis his headquarters. His territory will comprise the greater part of the southwest including Missouri, Texas, Oklahoma and Arkansas.

THE OSHKOSH MFG. CO., Oshkosh, Wis., has issued a little six-page booklet on pole line anchors. The bulletin fully describes in detail the new Oshkosh patent anchor.

Electrical Methods of Communication at Exposition.

The Panama-Pacific International Exposition at San Francisco in 1915 will display in a most comprehensive manner the achievements and activities of mankind during the last decade. Electrical methods of communication will provide many new and interesting features. Among these will be the now perfected system of wireless telegraphy and the latest developments in wireless telephony. The dictograph method, as well as the modern devices used in long established methods of communication by electricity, will also prove a source of much interest. The improvements in fire alarm and police signals will likewise command a great deal of attention by reason of the protection they afford to both life and property.

These exhibits will be housed in the Palace of Liberal Arts. The exhibits must of necessity be selective in character because of the comparative limitation of space which, by reason of wider participation and the world's more extended productivity, will be more restricted than at previous International Expositions. This will emphasize the advisability of applying for exhibit space as soon as possible.

The keen interest manifested by both American exhibitors and foreign governments, assures an exposition of the most representative international character. Latin America and the Orient will take very prominent parts. Invitations to participate have already been accepted by 26 foreign countries and 35 states have also accepted.

Merger of Washington and Oregon Companies.

A consolidation of the telephone systems of the Home Telephone Co., of Hood River, Ore., the White Salmon Valley Telephone Co., of White Salmon, Wash., and the Goldendale Telegraph and Telephone Co., of Goldendale, Wash., has been effected by the transfer of all the property, including franchises, leases and contracts, to the Oregon-Washington Telephone Co., an Oregon corporation recently organized at Hood River. Deeds were filed at Goldendale. A mortgage and deed of trust given by the Oregon-Washington Telephone Co. to the Portland Trust Co., of Oregon to secure the payment of a bond issue of $250,000 worth of six per cent. sinking fund bonds has been recorded.

The White Salmon Co. had 700 miles of lines with 341 telephones and was incorporated for $50,000 with a paid up capital of $27,000. The Goldendale company had 300 telephones in Goldendale with 270 telephones on connecting rural lines covering close to 1,000 miles of wire. The Goldendale company was incorporated for $50,000 with a paid up capital of $30,000. The consideration in the deal is not disclosed but is understood to be principally a transfer of the stock in the merging companies for stock in the Oregon-Washington company.

The White Salmon company and the Goldendale company had control of the long distance service in Klickitat county under contract with the Pacific States company.

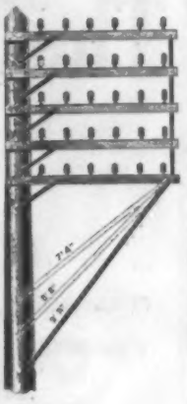
Long Distance Tariffs Filed in Washington.

The Pacific Telephone & Telegraph Co., has filed with the Washington Railroad Commission new tariff sheets listing more than 1,000 long distance toll stations in Washington. The new rates become effective on July 16.

The new tariffs provide for a straight air line distance. The rate is half a cent a mile per minute of conversation, with a 5-cent fixed terminal charge, a 5-cent differential and a charge of 50 per cent. increase for each minute, or fraction thereof, in excess of the first minute.

Security Specialties—

Make For Efficient Service



Security CAN TOP TERMINALS

Made with single panels firmly bolted to the heavy iron shoe and base. An important feature is the square base and cover, which makes it an impossibility to disturb fuses or connections when removing cover. Compact, accessible and economical to install and maintain.

Security Alley Braces

Strengthen and straighten your alley lines, and improve the appearance of your construction. Security alley braces are to be had in different lengths — illustration shows position of several lengths of braces used on 6 pin arm.

SECURITY DOUBLE ARMING BRACES

A good and inexpensive way of double arming. Security braces will carry heavy duplex or triplex drops without tipping or canting.
Guaranteed to make a stronger job than the costly double arm method of construction.

Ask for Booklet Number Six. It lists all Security Specialties.

The F. Bissell Company

TOLEDO, OHIO

"ARGUS" Advantages—or

the advantage of dependable lightning protection — Efficient service — reduced maintenance expense—satisfied subscribers. A saving in time and money.

Are you taking advantage of the

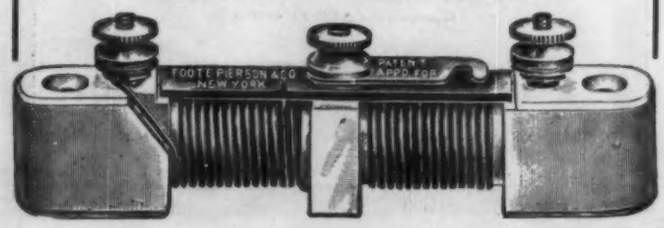
ARGUS Lightning Arrester?

Are your lines protected dependably? Why not use the arrester that is always on the job — fair or foul weather — the arrester that arrests lightning and causes no grounded circuits.

Get ARGUS literature.

Foote-Pierson Company

160 Duane St., New York, N. Y.



The men who are demanding real protection against lightning in the various forms of electrical disturbances are realizing that the vacuum principle of protector *is the only device that renders adequate protection.*

A trial will convince you of this fact.

If you are interested, write for catalog, and remember that the

"VAC-M"

is among the list of devices approved by The National Board of Fire Underwriters.

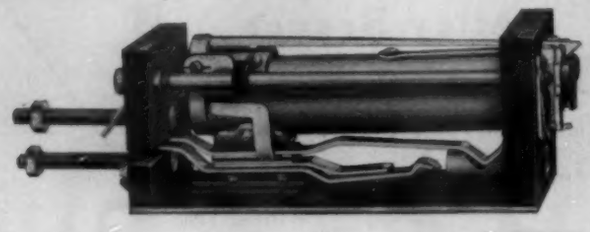
GET INTO LINE

The National Electric Specialty Company

Toledo, Ohio

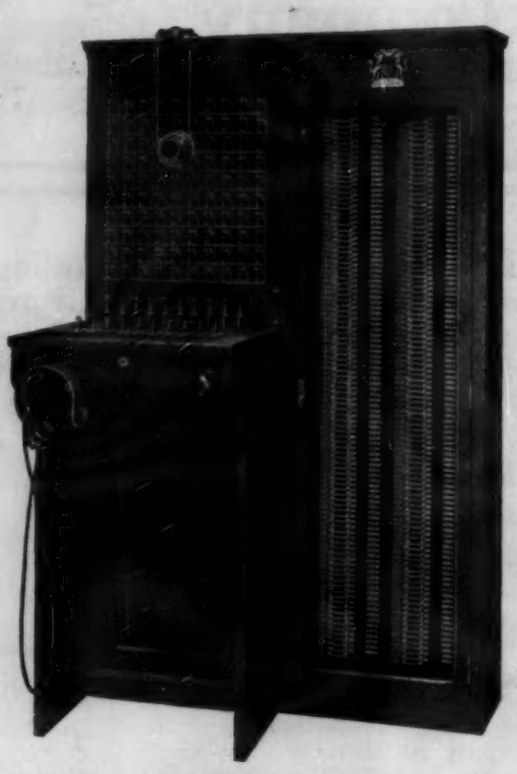
The True Reason

is clearly told in No. 31 catalogue. If you want a switchboard, you want the BEST switchboard.



There is but one SWEDISH-AMERICAN self-restoring, self-contained drop and jack. Notice the long, substantial jack sleeve which forms no part of the circuit; heavy German silver springs; removable coil from the front of the drop without loosening a screw or unsoldering a wire; positive night bell; double wound ring-off drops with condenser in each cord circuit; listening and ringing keys with contact points at the bottom, and every part constructed with a view to

Simplicity Economy Satisfaction



It is used by the Canadian Government and by thousands of Exchange and Long Distance telephone companies throughout the United States.

Be guided by the experience of experts. Ask for our picture book showing photographs of satisfied users. Convince yourself—a postal card will do it.

Swedish-American Telephone Mfg. Co.
5235 E. Ravenswood Park Chicago

CHASE

Repeat order—Special Model D Telephone Trucks—Capacity 1000 lbs. Price $1000.

Eliminate the Waste

GET your material and the line gang to the point of work with dispatch.

Figure the loss in taking two or three times as long as you should to carry a six man crew and driver to a job.

The horse and wagon method costs too much. Bills for idle men, idle material and teaming are too high.

Use Chase Motor Trucks. They carry the load and men everywhere — quick — on all kinds of jobs — on long suburban toll route work — between exchanges — and they save money by eliminating waste time.

Chase Trucks are simple, reliable, adequate, efficient. Actual service has proven it.

Write Dept. F-9 for some more profitable information on how to cut down the waste.

Six Efficient Models—Every Style of Body Capacities 500 to 4000 lbs.

Chase Motor Truck Co.
412 E. Jefferson St. Syracuse, N. Y.

Record of Telephone Patents Recently Issued

1,062,004. May 20, 1913. TELEPHONE SET; R. C. M. Hastings, Columbus, Ohio; assigned to the International Telephone Co. Describes a selective lockout system for party lines. When line is in use, other subscribers' sets are shunted from the line and a busy signal is displayed before the shunted subscriber. An electromagnetically operated pawl and ratchet device imparts to a rotably supported shaft, a step by step movement. The line shunted and the local battery circuit are operated alternately for connection and disconnection from the line by movement of the shaft.

1,062,082. May 20, 1913. TELEPHONE RECEIVER; Edward B. Craft, Hackensack, N. J., and John N. Reynolds, Greenwich, Conn.; assigned to the Western Electric Co. The magnetic circuit of a receiver is made up of a permanently magnetized steel bar and a soft iron pole piece welded to it.

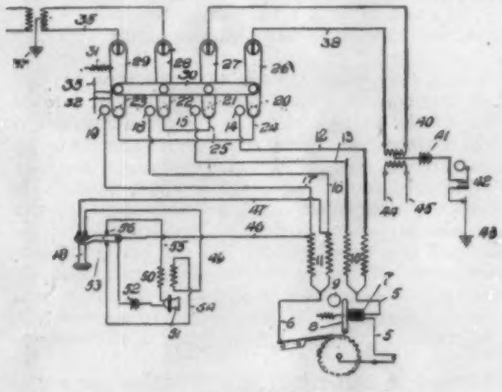
1,062,161. May 20, 1913. TELEPHONY; Isidor Kitsee, Philadelphia, Pa. A method of duplexing a telephone circuit is described. It consists in generating the home impulse in two secondaries of inductoriums, causing the impulse in one secondary to be neutralized and causing the impulse of the distant station to travel through one of the secondaries and the receiving device.

1,062,347. May 20, 1913. METHOD OF FORMING CABLE; Frank R. McBerty, New Rochelle, N. Y.; assigned to the Western Electric Co. A process of making ribbon cable, which consists in interweaving an insulating thread with a warp of parallel bare wires, is described. The travel of the woof thread is varied progressively, to omit all of the wires one after another for short intervals so as to leave portions of the wires exposed for electrical connections.

1,062,387. May 20, 1913. MEASURED SERVICE TELEPHONE SYSTEM; John Erickson, Chicago; assigned to the Automatic Electric Co. Describes a pay station for use on an automatic system. The calling party can ring another station but the calling station is rendered inoperative for talking when the called party answers. In order to establish a talking circuit, two or more coins must be deposited.

1,062,559. May 20, 1913. CUSHIONS FOR DIAPHRAGMS OF TELEPHONIC AND LIKE INSTRUMENTS; W. P. Stunz, Lansdowne, Md.; assigned to George Regester Webb. The cushion for the diaphragm comprises an elastic loop-formed annulus having undulatory branches, the inner portions of which are deflected.

1,062,577. May 20, 1913. TELEPHONE SYSTEM; E. E. Kleinschmidt, Brooklyn, N. Y.; assigned to the General Railway



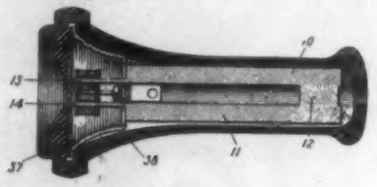
No. 1,063,096.

Equipment Co. Relates to a selector mechanism for calling any station on the dispatching line. The features are a central station selector generator, selectors at sub stations, and a common telephone battery, all being bridged across the circuit and each in series with a condenser.

1,062,586. May 27, 1913. SPRING MOUNTING FOR MAGNET ARMATURES; Chas. J. Erickson; assigned to the First Trust & Savings Bank, Chicago. A harmonic ringer for use on selective party lines is described. Its features are an armature controlled by a torsional spring extending at right angles to the plane in which the striker vibrates. Means are provided for adjusting the striker toward or away from the armature.

1,062,754. May 27, 1913. TELEPHONIC APPARATUS; C. Adams-Randall, Boston, Mass. Describes an electromagnetically operated vibrator for varying the resistance of a transmitter. The features are a system of electromagnets, inclosing the vibratory circuit closing members, and magnet cores which form an adjustable gap between them.

1,063,096. May 27, 1913. SIGNAL SYSTEM; G. S. Williamson, McKeesport, Pa.; assigned one-third to A. T. Johnston. Relates to combined telephone, telegraph and fire alarm apparatus. The features are four contact arms connected so as to move in unison and arranged for normally engaging a row of contacts for closing the main line circuit for the send-



No. 1,063,237.

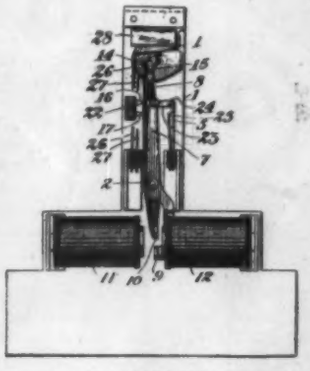
ing of an alarm. Two main line circuits lead from the contact arms and have repeating coils interposed with one-half grounded.

1,063,237. June 3, 1913. WELDED RECEIVER; Victor Anderson, New York; assigned to Western Electric Co. The pole pieces of horse shoe magnets are provided with shoulders and electrically welded to the magnets. The cup is clamped between the pole pieces and the magnet by the shoulders of the pole pieces so as to hold the pole pieces with fixed relation to each other.

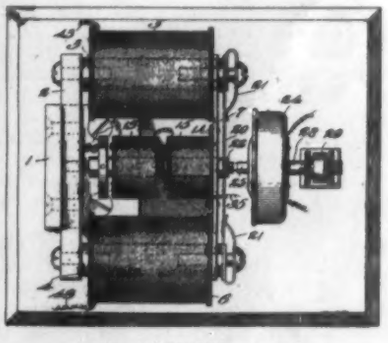
1,063,249. June 3, 1913. PROTECTOR; P. E. Erickson, New York; assigned to the Western Electric Co. Describes a protector for telephone circuits comprising two discharge plates, one of copper and the other of an alloy of copper. A thin sheet of insulating material having an opening there through is located between the plates and means are provided for clamping together the plates and sheet.

1,063,270. June 3, 1913. WELDED RECEIVER; John J. Lyng, Yonkers, N. Y.; assigned to the Western Electric Co. Pole pieces having forked ends are welded to the receiver bar magnets and an inclosing cup is clamped between the pole pieces and the bar magnets.

1,063,361. June 3, 1913. TELEPHONE SYSTEM; Oscar M. Leich, Genoa, Ill.; assigned to the Cracraft, Leich Electric Co. Describes special features of a trunking circuit in which the subscriber's instrument is provided with a signal receiving



No. 1,063,599.



No. 1,062,754.

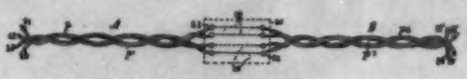
device responsive to currents of one polarity only. Means are associated with the trunk circuit to impress current from the source of current at the branch exchange, on the subscriber's signal receiving device to operate it, of a reverse polarity to that impressed by the central exchange.

1,063,599. June 3, 1913. TELEPHONE REGISTER AND LOCK-OUT DEVICE; Chas. V. Richey, Washington, D. C.; assigned to the Phone Call Recorder Co. Relates to a combined substation lockout device comprising, in addition to the transmitter and receiving circuit, a register actuating means in the transmitter circuit responsive to ringing current over the line. Normally closed contacts in the receiver circuit are opened by the register actuating means when ringing current is applied.

1,063,601. June 3, 1913. ANTISEPTIC MOUTHPIECE; Max Rosenwald, New York, and John C. Doran, Danbury, Conn.:

assigned to Frank A. Weeks Mfg. Co. A gauze is stretched over a perforated diaphragm and is kept in place by a mouthpiece held by spring fingers.

1,064,049. June 10, 1913. APPARATUS FOR RECORDING CALLS MADE BY TELEPHONE; Edward H. Bridge, Spotswood, Victoria,



No. 1,064,433.

Australia. In this device two sets of magnet coils, one placed above the other, are used. Effective calls are regulated by the meter only when both receivers are removed from the switchhooks.

1,064,433. June 10, 1913. METHOD OF REDUCING TELEPHONIC DISTURBANCES; O. B. Blackwell Maplewood, N. J., and J. A. Anderegg, Oak Park, Ill.; assigned to American Telephone & Telegraph Co. Relates to a method of reducing disturbances between adjacent conductors arranged in successive groups. It consists in determining the differences in the capacities of the conductors of one group with relation to those of another series and then so combining the capacities of the successive groups that they tend to balance. Also describes method of balancing a phantom circuit between the elements of successive sections of which there are inequalities in capacities.

1,064,492. June 10, 1913. MUFFLER ATTACHMENT FOR TELEPHONES; George Kracker, Philadelphia, Pa. A telephone mouthpiece is surrounded by a sound muffling hood which is intended to muffle sound to the exterior without interfering with its proper transmission.

1,064,599. June 10, 1913. TELEPHONE ATTACHMENT; William Bimson, Philadelphia, Pa. A receiver holder is described which is actuated by the movement of the head to cut the receiver in circuit.

Legal Cases and Decisions

By A. H. McMillan

Limited Free Switching Decisions.

In the issue of TELEPHONY for May 31, page 50, an inquiry was published concerning limited free switching. The query states that the company inquiring had just submitted to the Railroad Commission of Oregon, evidence in one of the strongest possible cases against the practice of free, or limited free switching between exchanges by a competitor, on the ground that the same is unjust and discriminatory to the subscriber having small use of the toll service, and preferential to the subscriber having large use of the toll service.

In answer to the question we received the following communication:

"In regard to free interchange of service rather than payment per call see matter of Antelope Mutual Telephone Co., 2 Neb., R. C. R. 145, Feb. 20, 1909, reprinted in 2 Commission Telephone Cases 496 (G. T. & Co.). See also some of the remarks of Chairman Clarke in Canon vs. Nebraska Telephone Co., 2 Neb., R. C. R. 91, 9 Commission Telephone Cases, 446, March 27, 1909 (modified order)."

Percentage of Rentals.

The Western Union Telegraph Co. transferred to the American Bell Telephone Co. all its telephone business and patents in consideration of a payment by the telephone company of 20 per cent. of rentals or royalties received from licenses or leases for telephones. The telephone company granted perpetual licenses to local companies and exchanges, receiving therefor a proportion of the stock of each company, and also rental for instruments used by it.

In a suit for an accounting between the companies, it was held that such stock so received, having been held to be rentals or royalties within the contract and the telephone company having so confused its receipt thereof, that there was no practical basis on which an apportionment could be worked out on the theory that the contract only ran for 17 years during the life of the patent and while licenses were unlimited, a decree refusing apportionment was proper. The court also held that the telephone company was not relieved from liability to account for 20 per cent. of such receipts by reason of the fact that the licenses and receipts also included the receipts from private lines, long distance telephones, etc., only to the extent of the qualified use, and not including any extra territorial rights for exchanges or long distance telephoning.

Further, it was held that the fact that the licenses stipulated that additional payments might be made for use of call bells and other incidental matters in which the telegraph company had no interest, did not affect the telegraph company's interest in the stocks so received; the defendant never having secured any additional royalties on account of such incidentals. There was no evidence in the case that the telephone company, in good faith, ever made any specific grant of the use of a specific number of telephones on lines between telephone exchanges, known as extra territorial lines independent of any licenses for telephones. Hence it was held that the telephone company was not entitled to any deduction in its accounting for extra territorial or private line telephoning.

Voluntary expenditures made by the telephone company in order to increase the value of such stock, for which no obligation was assumed in any way by the telegraph company, was held not to be considered in determining the amount the telegraph company was entitled to receive. The stocks accounted for were held subject to the commission of 30 per cent. mentioned in the contract.

The decree was that the telephone company pay to the telegraph company the sum of $1,645,765, together with interest dividends and other items amounting to $3,141,529. Western Union Telegraph Co. vs. American Bell Telephone Co., 203 Federal, 785.

Residence Telephone Used for Business.

Suit was brought against the Cumberland Telephone & Telegraph Co. for refusal to install a telephone in a residence of one Hartley at Nashville, Tenn. The suit was brought under section 11, chapter 667, acts of 1885, which require every telephone company doing business within the state to supply all applicants for telephone connection and facilities without discrimination or partiality, provided such applicants comply or offer to comply with the reasonable regulations of the company; that no such company shall impose any condition or restriction upon any applicant, that is not imposed impartially upon all persons or companies in like situation.

The section further provides that no company shall discriminate against any individual or company engaged in lawful business by requiring, as a condition for furnishing telephone facilities, that they shall not be used in the business of the applicant or otherwise.

The plaintiff was a real estate agent, who previous to January 1, 1911, had a telephone at his house. On that date he went to the office of the company to renew his subscription. On exhibiting his business card, the telephone agent saw his home telephone advertised on it. The card contained no business telephone, although there was a blank space for it. In fact, he had no office telephone and had not had one for some time, although he had an office outside his residence.

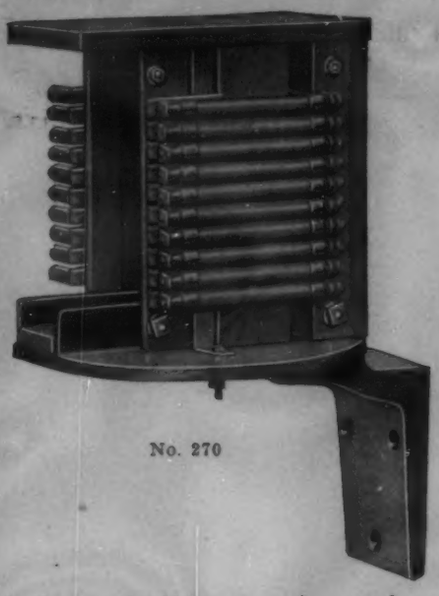
The agent informed him that he could not use his home telephone for business without paying the business rates, and objected to his putting his home telephone on his business card. Hartley then told the agent that if he could not use his telephone the way he was using it, he did not want it and ordered it taken out.

Subsequently he made a demand to have the telephone put in again and the same matters were gone over as in the previous conversation, with the result that no telephone was installed. At this time he offered to pay the rates for a home telephone for three months. As to the use of the telephone, Hartley testified that he occasionally wanted to use it to talk to customers in the evening or mornings when at home; that he did not use it especially for any business.

A verdict was given for the plaintiff which was modified by the supreme court of the state. On the subject of the use of the telephone, the court gave his opinion as follows:

"While we are of the opinion that a classification of telephones into residence telephones and business telephones is correct and proper, and that a larger rental may be demanded for the latter than for the former, we do not think an occasional use of the residence telephone in the manner just described would be a substantial breach of the classification, and justify the charging of the higher rate."

Cumberland Telephone & Telegraph Co. vs. Hartley, 154 Southwestern, 531.

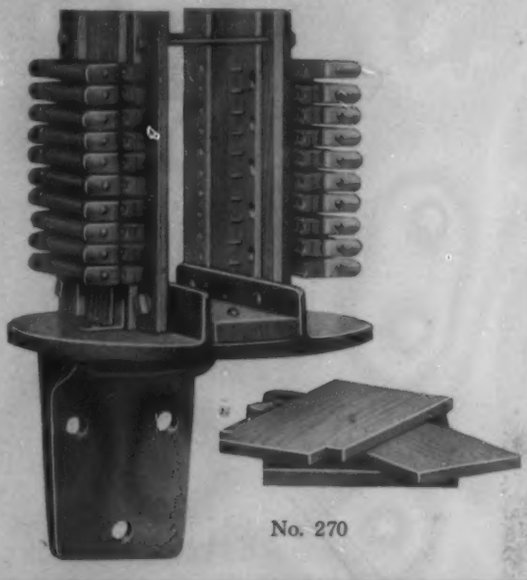


No. 270

"We have met the enemy and they are ours."
In a battle every means of protection is used, so why not "Route the Pretenders" with our big line of TERMINALS and PROTECTORS.

We show illustrations of No. 270 Can Top Terminal with Self Made Pot-Head. It is an ideal protected can top terminal for terminating cable without a pot-head.

At such time as it may be necessary to open the terminal for inspection of the cable connections, it is only necessary to remove the screws which fasten the top, loosen two bolts and slide out the end panels as shown here, when everything is exposed.



No. 270

Send for our No. 3 bulletin which describes this terminal fully.

Made and sold by

Lafayette Electric & Mfg. Company
Lafayette, Indiana

A step beyond the dry cell

BURN BOSTON BATTERY

To disparage—*knock*—another man's wares is an unhandsome thing. We talk about dry cells in general but not about any dry cell in particular. We should not talk about them at all except that they make the handiest yardstick with which to measure the performance of the BURN BOSTON. *And as a yardstick the dry cell has its faults.*

The BURN BOSTON lasts so much longer in service than any dry cell; its life in storage regardless of temperature and dampness is so nearly infinite; its uniformity of performance is so nearly absolute; its efficiency so difficult to comprehend by a mind which thinks in terms of dry cells—that this yardstick of ours is a poor stick at best.

At what cost of tireless watchfulness and painstaking attention to detail do you keep your subscribers supplied with current—and how often do you throw out live cells on the off chance that they may be gone before the next inspection?

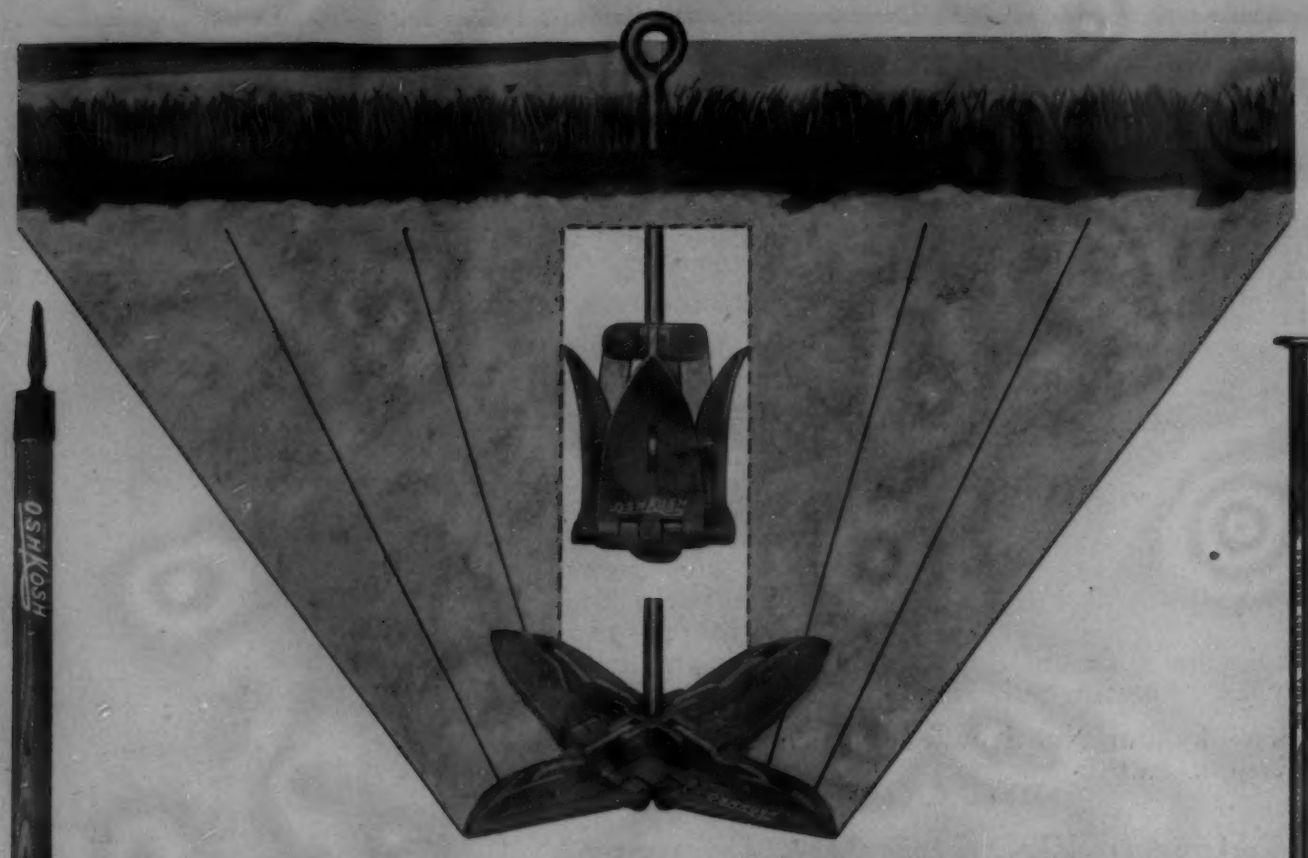
The dry cell is not a necessary evil.

Here are costs, wear and tear and lost motion that can be cut.

In the name of "Efficiency" use the Burn Boston!

Interesting tests are now being conducted showing conclusively its superiority. Reports on these tests together with literature sent upon request.

BURN BOSTON BATTERY, 17 DOANE STREET, BOSTON



The Oshkosh Anchor With Its Convex Blades and Greater Expansion Affects More Surface Than Any Other Anchor Made

This is the strong point of the Oshkosh Anchor—its holding power. Why install an anchor that is more cheaply installed, but only holds under favorable conditions?—You want an anchor that will hold under all conditions. The Oshkosh not only has the holding power, but it is easily installed. No tools required—the strain on the guy expands it—the stronger the strain the greater the expansion of the Oshkosh Anchor.

Four blades expand out into undisturbed virgin earth and each blade has 50 per cent more expansion than the blade of any other anchor. This comparison is made from actual tests.

	4 in. size	6 in. size	8 in. size
Oshkosh expanded	11 in.	16½ in.	22 in. in 4 ways
Other makes expanded		11 in.	15 in. in 2 ways only

The Oshkosh anchor with all its advantages costs you no more than other inferior anchors. Investigate the Oshkosh—try it out and you'll want no other.

We manufacture a complete line of construction tools and specialties. Every one the best. Our new catalog is ready—get a copy now so you will have it when you want it.

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Morris Building

TRADE OSHKOSH MARK

TRADE OSHKOSH MARK

Transmission is the Foundation of Good Telephone Service

Reproduced from the last issue of W. & M. Telephone Wire News

MR. A. L. STADERMAN in an article entitled, "Transmission the Foundation of Good Telephone Service," which appeared in the June 7th issue of TELEPHONY, emphasizes that the subject of transmission is of very great importance to the telephone business. Without good transmission the traffic and commercial departments of a telephone company are helpless to serve the public. The telephone company with good transmission in a community where competition prevails, can, according to Mr. Staderman, effectively combat competition.

Of the several factors determining the character of transmission WIRE is one of the most important.

We submit our three brands—"E. B. B.," "B. B." and "Steel" as **the best that can be produced** from standpoint of conductivity, galvanizing and tensile strength—three important features contributing to good service.

"W. & M. Telephone Wire News—which describes telephone wire in practical use, furnished free upon request."

American Steel & Wire Company

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CHICAGO, 72 W. Adams St.
NEW YORK, 30 Church St.
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SALT LAKE CITY, Dooley Building

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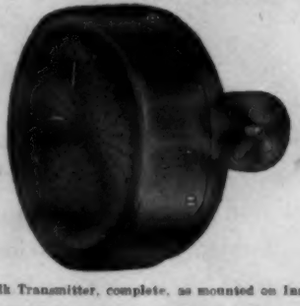
A step ahead—and a "7 league boot" step at that.

The Gottschalk Transmitter is new—is different—is far in advance in every way of the present, flaring mouthpiece — springy — delicately built transmitters.

The GOTTSCHALK transmitter is sanitary—waterproof. It has no exposed mechanism—no springs. No maintenance expense.

It transmits voice in clearer, natural tones. It requires no electrical changes in plant and gives better and more satisfactory service at less current consumption. It's the logical step ahead in transmitters—from every point of view.
Inquiries solicited.

GOTTSCHALK WATERPROOF SANITARY TRANSMITTER CO.
160 Broadway · NEW YORK CITY



Gottschalk Transmitter, complete, as mounted on Instrument

A Cool Telephone Booth

The Hot, Stuffy Booth is no longer necessary.

Booths cooled by Sturtevant Ventilation please the user and **increase tolls** for the Telephone Companies.

Sturtevant
(REG. U. S. PAT. OFF.)

ELECTRIC TELEPHONE BOOTH VENTILATOR

This little electric multivane ventilator keeps the booth flooded with fresh pure air, free from drafts.

It does its work quietly, without in anyway impairing the sound-proof qualities of the booth.

The sets are complete in every detail, and are very easy to install. The operating expense is very small.

Write for Booklet T

B. F. Sturtevant Company
HYDE PARK BOSTON, MASS.
And all principal Cities of the World
Also distributed by

Western Electric Company

Splice Economically — Correctly — Dependably

NATIONAL
Double Tube
Wire Connectors

offer the most efficient method of repairing lines. They form practically a welded joint—stronger than the line.

National Double Tube Connectors prevent moisture and rust from attacking the line and do away with the necessity of using solder to finish a splice.

Use tinned copper sleeves for iron wire—they make trouble-proof joints.

Let us send literature and prices.

NATIONAL TELEPHONE SUPPLY COMPANY
CLEVELAND, OHIO

"The returns from our Classified Advertisement surprised us."

. . . . . .

Was what an Eastern company said who recently used a TELEPHONY Classified Advertisement. The actual orders resulting from their advertisement exceeded the quantity of equipment offered for sale.

This shows that a more than ordinary responsiveness and alertness prevails among TELEPHONY subscribers; it shows too, that telephone companies *habitually* refer to the classified advertising columns.

. . . . . .

Whether you desire help—a position—an exchange; whatever the character of your wants or needs, try a TELEPHONY Classified Advertisement—*it's the solution.*

Idaho Red Cedar **Poles**

Sandpoint Lumber & Pole Co., Ltd.

SANDPOINT, IDAHO.

Large Stocks—Prompt Shipments
Good Quality—Right Prices

NAUGLE

Pole & Tie Co.
5 South Wabash Ave.
Chicago, Illinois

The Trinity in Poles
"Service—
Price—
Quality."

POLES

Cedar

We **are now** distributors of both Western Red Cedar and Northern White Cedar Poles.

Crawford Cedar Co.
Menominee, Mich.

Poles

"FROM THE STUMP TO THE LINE"

NATIONAL POLE COMPANY
ESCANABA, MICH.
CEDAR POLES

Very Few Systems Employ Flimsy Construction any more. The Better the Company, the Better Its Methods. We are Able to Fill the Most Exacting Requirements of the Very Best Companies.

Over fifteen years of experience in WHITE and WESTERN CEDAR POLES
Exceptional Facilities. Yards at the Most Favorable Shipping Points.

National Pole Co., Escanaba, Mich.

Please tell the Advertiser you saw his Announcement in TELEPHONY.

POLES

Bradley Timber & Railway Supply Co. - Duluth, Minn.

Mr. Buyer?

Do You Realize the Importance of Buying from a Producer?
Our POLES Have Our Concentrated Attention from Stump to Car.
ONE PROFIT—ONE QUALITY—ONE PRICE

954 Security Bank Bldg., Minneapolis, Minn. **TRI-STATE CEDAR CO.** 208-209 Harding Bldg., Coeur-d'-Alene, Idaho

WRITE US—WE MAKE LOW PRICES—SHIP GOOD STOCK
Idaho Red Cedar Poles
30 CEDAR YARDS IN IDAHO, WASH. AND B.C.
WESTERN LUMBER & POLE CO.
Main Office: "Electric" Bldg., Denver, Colo.

Warehouse: Brookport Ill. **LONG LEAF** Mills: Corinth and Ripley, Miss.
YELLOW PINE CROSS ARMS
Ship in any Quantity. Standard and Special Sizes
SOUTHERN PINE MFG. CO., PADUCAH, KY.

"K-H" stands for KIRBY-HAWKINS
When in the market for
CEDAR CYPRESS **POLES** AND CHESTNUT
remember the name.
WRITE FOR OUR QUOTATIONS
Address Kirby & Hawkins Co. 322 Arcade Bldg. Philadelphia

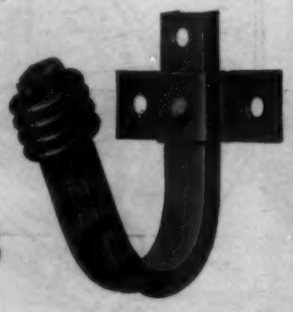
Idaho Cedar Poles
Northern Mercantile Co. Ltd.
Resident Producers
Sand Point, Idaho

POLES OF STERLING QUALITY
Oldest Cedar Pole Firm in Business
MICHIGAN AND WESTERN CEDAR
W. C. STERLING & SON COMPANY
MONROE, MICHIGAN

Going to add more lines?—Going to improve your service?

Then you need

Peirce Brackets



Brackets of every description and for every angle of construction—brackets that will allow of increased facilities with the least possible labor.

Hubbard Hardware — a complete and progressive line comprising the latest and best tools for every purpose.

WRITE FOR CATALOG

HUBBARD & CO.

NEW YORK PITTSBURGH CHICAGO

Avenarius CARBOLINEUM REGISTERED
PRESERVES WOOD EVERYWHERE
Most concentrated oil for brush or open tank treatment of poles and cross arms
TESTED BY TIME
CARBOLINEUM WOOD PRESERVING CO.
Dept. 5, Milwaukee, Wis.

IDAHO AND NORTHERN
CEDAR POLES
WE ARE PRODUCERS
Yards in IDAHO, MICHIGAN, CANADA.
Toledo Yard for Urgent Orders. Get our Prices.
Ask for Leaflet No. Six
THE F. BISSELL COMPANY, TOLEDO, OHIO

Note Protection at Corners

Blake Insulated Staples

Unequalled for telephone and bell wiring. The fibre insulation prevents troublesome short circuits and grounds.

5 Sizes Pat. Nov., 1900

Write for Samples

Blake Signal & Mfg. Co.
BOSTON, MASS.

The Wire That Lasts

when exposed to the elements is one which resists the tendency to rapid corrosion. **ROEBLING DOUBLE GALVANIZED TELEPHONE WIRE** is such a wire because it is made from metal of good quality in such a way as to preserve a uniform structure. This causes the galvanizing to **hold and protect** when the wire is spliced thus preventing the cracks through which moisture percolates and brings rust.

The galvanizing itself is the best development of an experience of more than half a century.

John A. Roebling's Sons Co.

Trenton, N. J.

Warehouses: New York Chicago Philadelphia Pittsburgh Cleveland
Savannah, Office Atlanta San Francisco Los Angeles Seattle Portland, Ore.

B & K

B & K Guy Clamp

The clamp that holds beyond the breaking point of the rope.
Made in one piece of drawn steel—practically indestructible.
A powerful T head bolt holds the wire solidly against grooved recess of the clamp.
The case portion is made from drawn steel and retains its shape even when the breaking point of the rope is reached.
You want to know more about the B. & K. guy clamp. It means economy—efficient construction.

The B & K Catalog—Yours for the asking

Barnes & Kobert Mfg. Co.

New Haven, Conn.

The saving of time, material and labor effected by

BLACKBURN'S Boltless Clamps

Blackburn's *Boltless* Guy Clamp

will ***reduce your guying expense decidedly*** and ***increase the efficiency*** of your line.

Blackburn's *Boltless* Pole Clamp

The Boltless Guy Clamps save 3 to 4 feet of guy wire—are attached quickly—do not harm the strand and hold absolutely rigid.

The Boltless Pole Clamps save one or more wraps of strand around pole—and a foot or more at end. Save ¾ the shims—as none are needed back of clamp.

Blackburn's *Boltless* Twin Guy Clamp

The Messenger or Wire Splicer will connect two pieces of strand the same or different sizes—***quickly*** and ***permanently.*** Does not slip or injure the strand.

Blackburn's Messenger or Wire Splicer

Write For Booklet

Everstick Anchor Co.

ST. LOUIS, MO.

Classified Advertisements

Classified Advertisements in "TELEPHONY" cost 5 cents per word—minimum number of words per insertion, twenty. Cash should accompany order. Advertisements in black face type, 10 cents per word. No advertisements accepted after Thursday.

Equipment For Sale

"REBUILT" TELEPHONE APPARATUS and exchange equipment saves you 30 to 50 per cent without sacrificing quality or efficiency.

SWITCHBOARDS —Telephones—Apparatus—Protection Equipment—Cable—Everything you need for the installation and operation of a complete exchange—Magneto or Central Energy—of the best and most reputable manufacturers.

SIX YEARS SUCCESSFUL OPERATION of our "Rebuilt" Equipment Department puts it past the experimental stage. Quality and price will make you a permanent customer. Better investigate.

Ask for Our Free No. 78 Bargain Bulletin

Address
"Rebuilt" Equipment Department
PREMIER ELECTRIC COMPANY
CHICAGO, ILL.

"REBUILT" when connected with PREMIER means something

UNUSED TELEPHONES FOR SALE CHEAP—All parts are guaranteed—if not satisfied return to us. Prices and literature on request. Interstate Elec. & Mfg. Co., Sioux City, Iowa.

FOR SALE—Telephones bridging, three to four dollars each; telephones, series, one to three dollars each; Sterling terminals with cable attached 100 line go at $15 each. Everything sent out guaranteed. Phones without batteries one dollar, switchboard cable, generators, induction coils—everything telephony. Address: Telephone Sales Co., Oxford, Wis.

A PRINTOGRAPH FOR SALE; $75 takes it, with motor and type, complete. For circular letters, bills and office printing. Fine condition. Worth $250. TELEPHONY PUBLISHING CO.

Cable Testers

WET CABLE TROUBLE—If the wet spot can be located without cutting the cable the Wireless Cable Tester will do it. Sent on trial. Address, Electric Spec. Mfg. Co., 426 Granby St., Cedar Rapids, Iowa.

Cross Arms

CROSS ARMS manufactured from sound, straight grain Douglas fir. Send us specifications and get our prices before buying. Cameron Lumber Co., Ltd., Victoria, B. C. Can.

Directory Hangers

WE BEG TO DIRECT YOUR ATTENTION to the Universal Wire Loop, an improvement upon the ordinary string loop for hanging up catalogues, directories, telephone books, prices current, etc. Write us for prices and samples. Wire Loop Mfg. Co., 75 Shelby St., Detroit, Mich.

Expert

I AM A PATENT EXPERT. Consulting Engineer and Specialist in Electrical and Telephone Engineering. What is your problem? Francis W. Dunbar, Monadnock Block, Chicago, Ill.

PATENTS DON'T PAY UNLESS PRACTICAL. BEFORE SPENDING MONEY TAKING OUT PATENT, ASCERTAIN VALUE OF YOUR IDEA FROM VAN DEVENTER & WARREN, SUMTER, S. C., TELEPHONE ENGINEERS OF MANY YEARS' EXPERIENCE.

Help Wanted

WANTED—Energetic, first-class telephone salesman for Eastern territory. State qualifications and salary expected. Address Resident Representative, care TELEPHONY.

Loose Leaf Binders

FOR SALE—Loose Leaf Binders for telephone records as supplied to New York Telephone Company. Tell us your requirements. Buchan Sales Co., 314-320 Market St., Newark, N. J.

Plants For Sale

FOR SALE—Exchange in Oklahoma oil region; 30 miles rural lines; 94 telephones; undeveloped territory. Address W. G. S., care TELEPHONY.

FOR SALE—Telephone exchange of 350 telephones, all lines metallic, cable in city, all cross arms of fir with locust pins and both treated with carbolineum, galvanized hardware, 18 farm lines, rates $1.50 city, $1.50 country, $2.00 business, desk telephones $.50 extra, good live town, collections good, exchange in good shape—no junk pile. Selling on account of too much other business. Address R. 5, care TELEPHONY.

FRANKEL TESTING CLIPS

No. 2521
The Standard Patented U. S. Nov. 15, 1904 and Foreign Countries.

The teeth grip the wire or binding post, the pin pierces the insulation of wire, making a perfect test connection.

Order today.

PRICES
Less than 12, 20c
Doz. lots 12½c
100 lots 11c
500 lots 10c
1000 lots 9c

FRANKEL DISPLAY FIXTURE CO.
733-735 Broadway, New York

FOR SALE—Five telephone exchanges. Liberal terms. Will bear close investigation in conditions and profits. Write Coon Bros., Rantoul, Ill.

Plants Wanted

WANTED—To buy a 400 to 600 line telephone plant in or near Iowa, or will accept position as manager, superintendent or accountant for a larger company. Address 1486, care TELEPHONY.

Poles

WE HAVE A LARGE STOCK of Western Red Cedar Poles, Northern White Cedar Poles, Butt Treated Poles. Get our prices. Page & Hill Co., Minneapolis, Minn.

Pole Changers

AN EFFICIENT POLE CHANGER makes good under all conditions—only $15 complete—why pay more? Order on 30 days' free trial or write, Current Electric Co., 18 E. Kinzie St., Chicago.

Positions Wanted

WANTED—Permanent position as cable splicer or wire chief in charge of plant, by sober, industrious man of 30. Address 1485, care TELEPHONY.

WANTED—Position as manager. Employed by present company for seven years, prefer a Northwestern location, state salary. Address Lock Box No. 62, Bantry, N. D.

WANTED—A No. 1 troubleman wants permanent location; can deliver the goods and can furnish references. Address B. K. Brayley, Bentonville, Ind.

Protective Apparatus

NO DANGER of damaged cable where Moon Terminals are used. Write for literature explaining the terminals that will cut cable maintenance expense. Moon Mfg. Co., 120 N. Jefferson St., Chicago.

Telephone Pay Stations

COIN COLLECTORS, Baird pay stations, best ever, numerical signals, separate cash box and incomparable features. Also Baird time stamps and peg counters. Baird Equipment Co., 3239 N. Clark St., Chicago.

Telephone Pay Station Signs

TELEPHONE PAY STATION SIGNS—Finest porcelain enamel. Practically indestructible. Retain true colors and finish. Get the ones with the reputation. Burdick Enamel Sign Co., 166 N. State St., Chicago, Ill.

Telephone Printing

OUR BOOKS, blanks and forms are used by 5,000 telephone companies. Send for free samples. Phone-Print, Defiance, Ohio.

Telephone Supplies

TELEPHONE SUPPLIES—Large and complete stock, prompt shipments and best discounts. Send for our catalogue Harry I. Wood Co., 514 W. Main St., Louisville, Ky.

WE ARE JOBBERS of electrical supplies. Our service and prices are unexcelled. Let us send you our catalog. Robinson-Nelson & Co., 711 E. Main St., Richmond, Va.

CONSTRUCTION SUPPLIES—Anything you need for your construction work can be ordered from us at prices that can't be beat. Doubleday-Hill Elec. Co., 721 Liberty Ave. Pittsburgh, Pa.

WE ARE JOBBERS. Get our prices on telephones, wires, pins, brackets, poles, cross arms, glass insulators—pole line hardware. Indianapolis Elec. Supply Co., Indianapolis, Ind.

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A New Type of Portable D'Arsonval Galvanometer

Sensitivity—1 megohm. **Resistance**—about 225 ohms. **Period**—about 2.5 seconds.

A suspended D'Arsonval galvanometer—so rugged that it will withstand more rough usage than an ordinary voltmeter.

The moving system is contained in a separate unit which is easily removable. Should the system become damaged due to excessive jars, this unit may be removed and returned to us by mail; weight, 4 ounces. Repairs will be made within one day of receipt.

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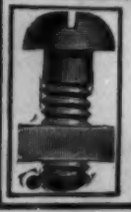

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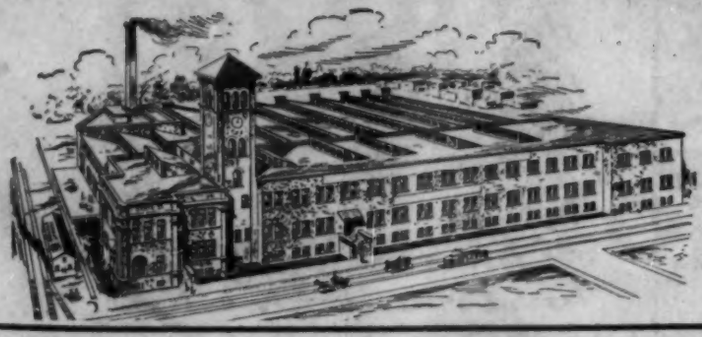

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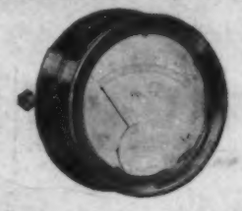

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